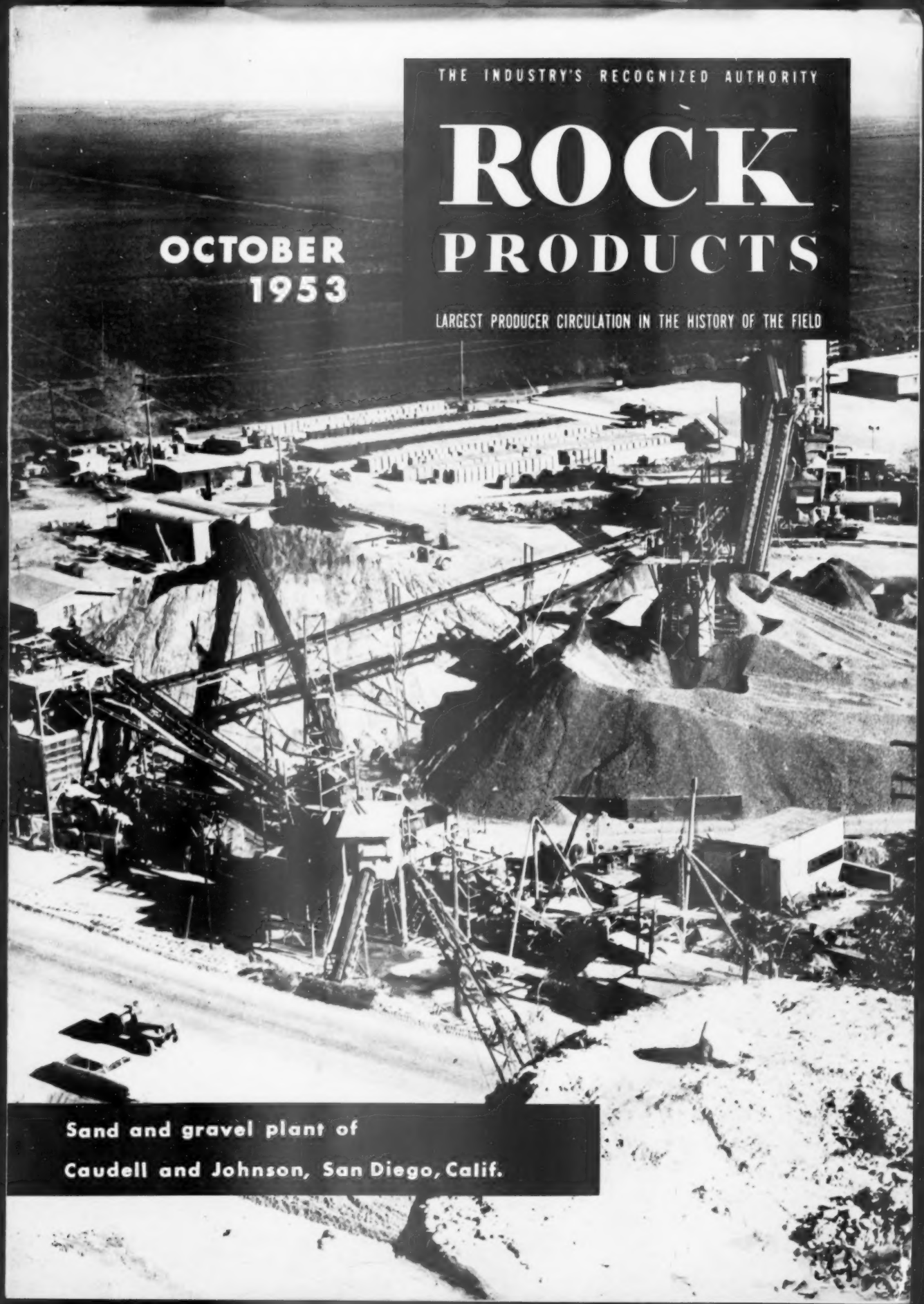


THE INDUSTRY'S RECOGNIZED AUTHORITY

ROCK PRODUCTS

LARGEST PRODUCER CIRCULATION IN THE HISTORY OF THE FIELD

OCTOBER 1953

Sand and gravel plant of
Caudell and Johnson, San Diego, Calif.

WANT TO TAKE A DARE?



Here's a challenge to any owner of any competitive machine.

Your Caterpillar Dealer will demonstrate any Caterpillar-built machine against any competitive unit . . . and he'll do it on your job.

He'll do it—not with a chip on his shoulder—but to show you that a Caterpillar-built machine will do your job better, with more production in less time and for a longer period without down time that costs you money in time and repairs.

If you own Cat* equipment you know it will do these things. If you're using another make, here's your chance to find out whether or not you're getting your money's worth.

If you've never used Caterpillar equipment on your job our dare gives you a chance to compare the working ability of Cat machines with others.

Take the dare . . . get a demonstration . . . any way you look at it, you'll be the winner.

Call your Caterpillar Dealer and say, "Yes, I'll take your dare." Tell him where and when. He'll do the rest.

Caterpillar Tractor Co., Peoria, Illinois.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



Grommet belts last 3 times longer in 90 day use-and-abuse test

B. F. Goodrich V belts last longer, yet cost no more

BIG portable crushing plants like this are built to take the jolting, jarring action of rock crushing. But the shock to V belts is terrific. In this case, the belts used to drive the crusher weren't lasting much more than 30 days. A B. F. Goodrich man heard about the frequent replacements, and asked to install a test set of Grommet V belts. Instead of being ready for the junkpile after 30 days, the Grommet belts were still going strong after 90 days of rugged use and abuse.

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⅓ more gripping power

Grommet V belts have more rubber in relation to belt size. Without any stiff overlap, they're free to flex and grip sheaves better. Size for size, Grommet belts give ⅓ more gripping power with less slip, pull heavier loads with a higher safety factor.

Send for proof today

Send the coupon for a set of reports showing actual installations where Grommet V belts have outlasted all others. See how you, too, can make important savings in belting, production and maintenance costs with these stronger, longer-lasting V belts.

Grommet—T. M. The B. F. Goodrich Co.

The B. F. Goodrich Company
Dept. M-85, Akron 18, Ohio

☐ Send set of installation reports on B. F. Goodrich Grommet belts.
☐ Have a BFG distributor call on me.

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Company_____

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ROCK PRODUCTS

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Bror Nordberg
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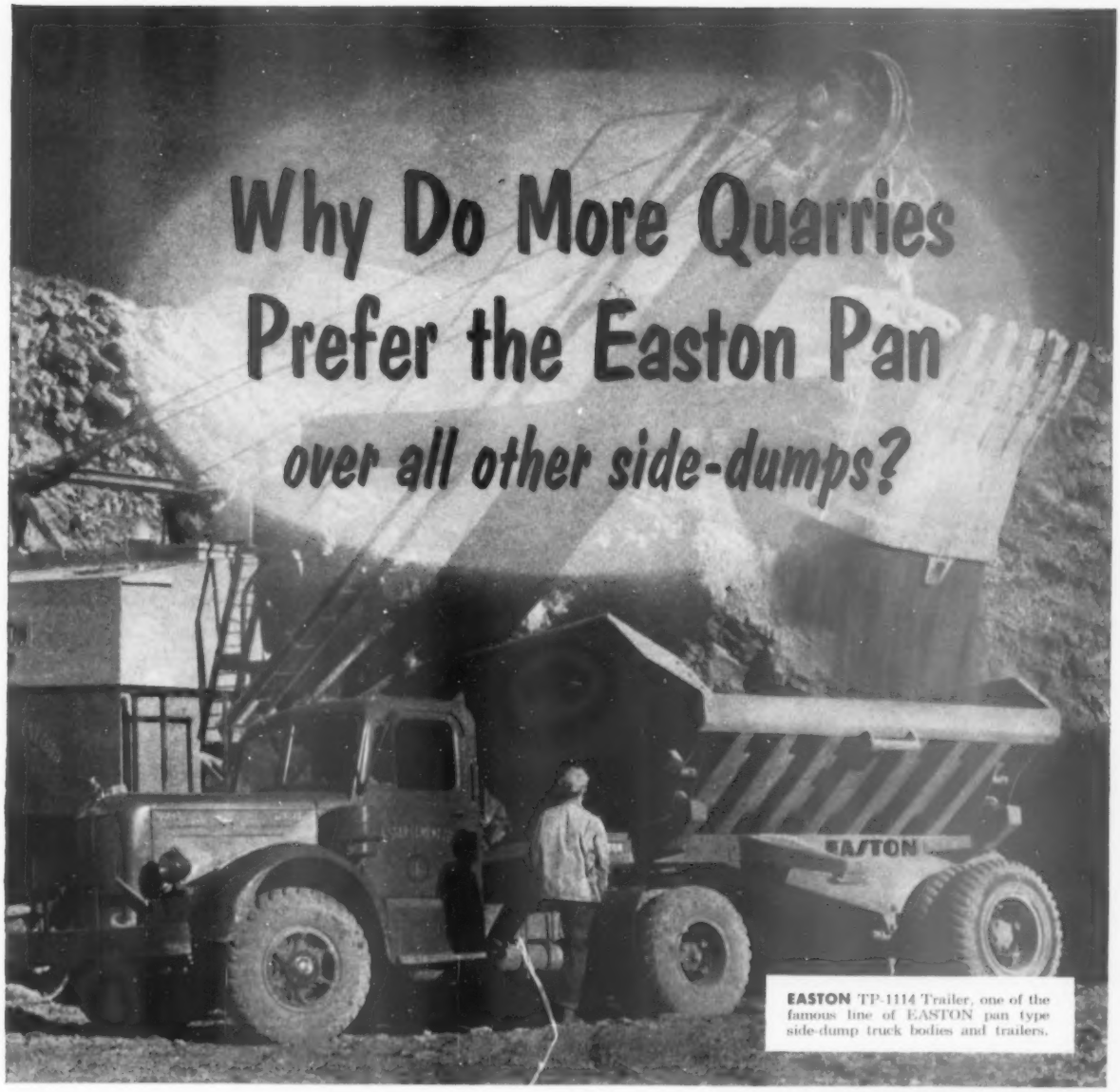
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EASTON TP-1114 Trailer, one of the famous line of EASTON pan type side-dump truck bodies and trailers.

More crushed stone and cement plant quarries use the EASTON pan than all other side-dumps combined. Here, a few important reasons why:

CAPACITY! There are four standard capacities, trailer or truck-mounted, to meet almost any speed, load or grade requirement. Improved design adds 13% more water-level capacity with no increase in overall dimensions. Combination units provide capacities up to 40 tons.

FLEXIBILITY! The EASTON pan may be used in double-trailer or truck-body-and-trailer combinations. Each unit of such a combination may be used independently to meet varying job requirements. Also, the combination may be separated for individual maintenance on truck, tractor, or either haulage unit.

ECONOMY! The doorless two-way, reversible side-dump body has no moving parts — nothing to go wrong. Complete cost of installation, with truck or tractor of your choice, is surprisingly low. Savings pile up through years of dependable, productive service.

SMOOTH! You roll up, side-dump, and roll away in a smooth, straight production-line operation. No backing, no turning at the dumping point. The driver sees where he is going at all times. Operation is easy on fuel, easy on tires, easy on the truck or tractor engine, easy on the driver, easy on cost.

B-1050

SAFETY! Dumping is remote-controlled, feeding stop-and-hold to the crusher. EASTON overhead hoist eliminates the dead weight and costly maintenance of individual integral body hoists.

Use this easy way to get the facts:

Backed by 40 years of specialized experience in quarry transportation, EASTON engineers have designed a copyrighted DATAFORM which has enabled hundreds of operators to get basic cost and performance data related specifically to their own transportation problems. It will pay you to investigate! Write today, without obligation, for your free copy of the DATAFORM.

EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

EASTON



Slattery Contracting Co., Inc. uses TIMKEN® carbide insert bits for faster drilling, fewer bit changes on New Jersey highway job

IN drilling operations on the new road connecting the George Washington Bridge and the Palisades Interstate Parkway, the Slattery Contracting Co., Inc. gets increased drilling speed with fewer bit changes by using Timken® carbide insert bits. They are most effective for drilling extremely deep holes in the New Jersey trap.

Timken carbide insert bits always give highest speed through hard and abrasive ground. And they're most economical for constant-gage holes, small diameter blast holes, extremely deep holes.

But they're *not* your best solution for all your drilling problems!

For ordinary ground, Timken multi-use bits are most economical. With correct and controlled reconditioning, they'll give the lowest cost per foot of hole when full increments of steel can be drilled.

Most important of all, both Timken carbide insert and multi-use bits are interchangeable in the same thread series. A wide range of different Timken bits fit the same drill steel! As the ground changes, you change bits quickly, easily—right on the job!

Both Timken carbide and multi-use bits are made from electric furnace Timken fine alloy steel, and have special shoulder unions that protect threads from drilling impact.

For the bit type best suited for your drilling requirements—whether multi-use, carbide insert, or both—call on the Timken Rock Bit Engineering Service. Write The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".



Timken threaded multi-use rock bit



Timken threaded carbide insert rock bit

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Hugh McMillan's Business



...is ROCK!

Hugh McMillan has proved his Northwests in all the kinds of work *you* have to tackle. He can tell you how well a ¾ yd. Northwest Model 25 will batch an Asphalt Plant. He holds the record for production with his plant in the State of Texas. And Rock? Here's his new Northwest Model 6 in the McMillan Quarry at El Paso — the sixth Northwest in his fleet!

With a *real* Rock Shovel, quarry output is no problem and when you have a real Rock Shovel *you never have to worry about output in any kind of digging.*

Performance and output are the reasons for repeat orders in the hands of successful outfits like Hugh McMillan. It can be a guide to your Shovel, Crane and Dragline purchases that you can count on. Why not talk to a Northwest Man?

NUMBER SIX
NORTHWEST
for HUGH McMILLAN
El Paso, Texas

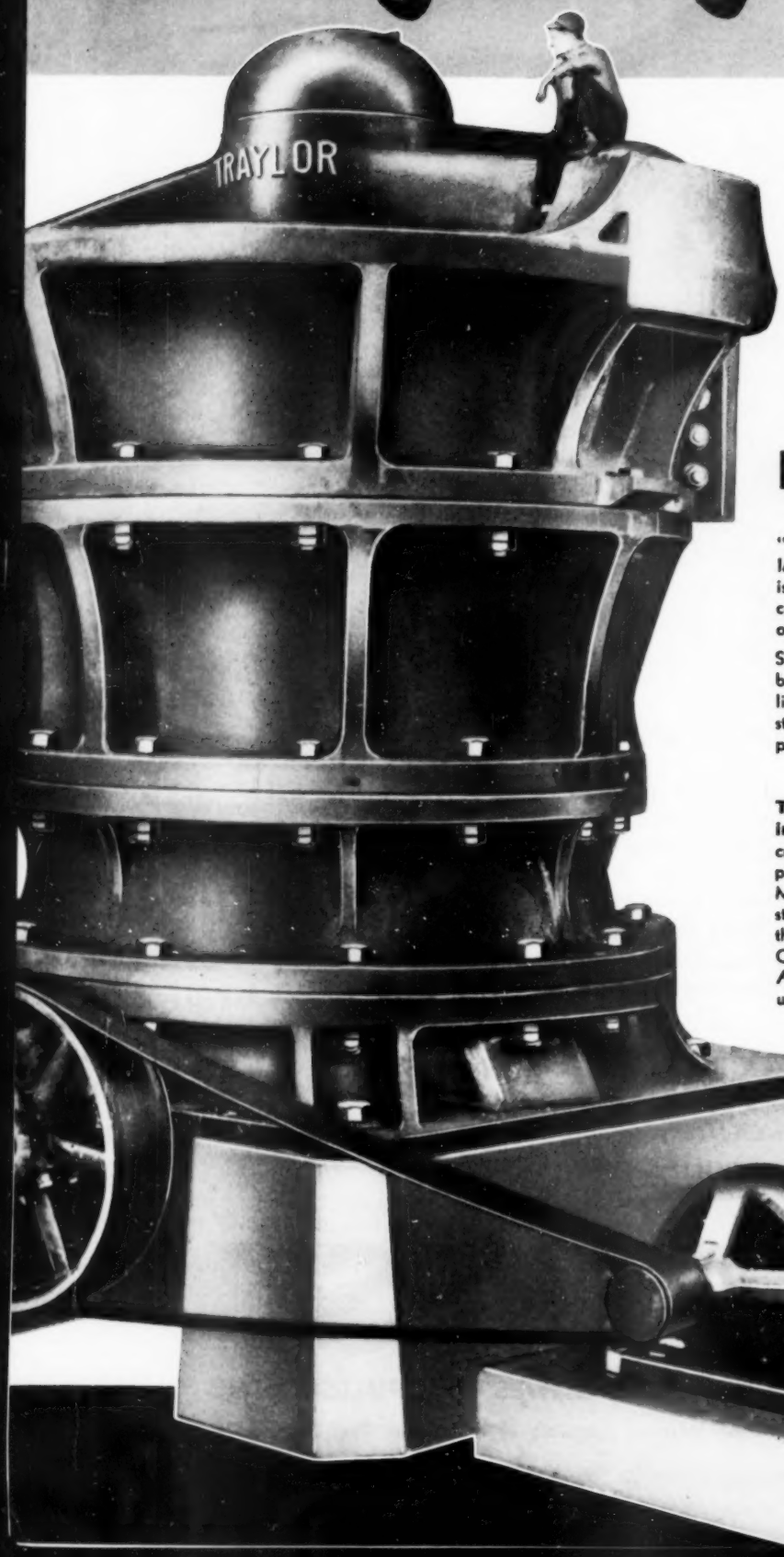
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SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

Convertible for any Mining Material Handling or Excavation Problem

BIG Gyratory Crushers



THE 6th 60" GYRATORY BUILT BY TRAYLOR

"Traylored" to produce 30,000 tons per day, the latest of Traylor's super-size 60" Gyratory Crushers is on its way to the famous copper mine at Chuquicamata, Chile. This crusher is equipped with Traylor's original curved concaves and bell head.

Some idea of the weight of this gigantic machine can be judged from the relatively small eyebolt used to lift the shaft. It weighs over half a ton. The cast steel frame of the crusher is over 5" thick at several points.

Traylor built the first successful 60" Gyratory in 1919 . . . 34 years ago. It proved that a gigantic crusher with high hourly capacity could effect amazing production economies. This first 60" was sold to a Michigan limestone producer. Because of its outstanding efficiency, this same customer purchased their second 60" Traylor Gyratory four years later. Of these 60" crushers, three are in Michigan, one in Arizona, one in England and one in Chile. Capacities up to 3500 tons per hour.

A Traylor LEADS TO GREATER PROFITS

Since 19

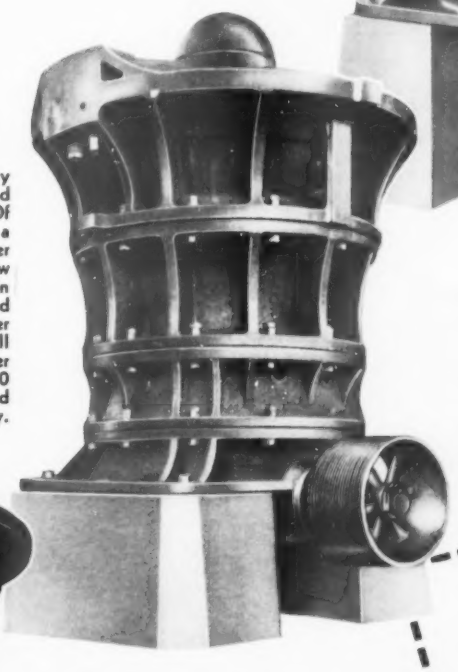
s are "Traylor-MADE"

Result: Traylor has acquired special skills and facilities for building these big machines.

With 38 of these huge Gyratory Crushers in the field, Traylor design and construction have been proved under a wide range of operating conditions. To match this accumulated "know-how," Traylor has expanded facilities to build these big crushers with precision and efficiency. Consequently, the producer who needs 645 to 3500 tons hourly production will find the Traylor TC a crusher of unusual operating economy and dependability. Write concerning your requirements. Let us show why it pays in the long run to buy a Gyratory "Traylored" to your individual needs.



FOUR 48" Traylor Gyratory Crushers have been built and TWO are in the works. Of those in the field, one is in a Pennsylvania ore mine, another is crushing trap rock in New Jersey, still another is in Minnesota on iron ore and the fourth in Nevada on copper ore. The two in the works will be crushing iron ore and copper ore. Capacities up to 1980 tons per hour are obtained with the 48" Traylor Gyratory.



EIGHT 54" Traylor Gyratory Crushers are in the field; four in Canada, one in England, one in Mexico, one in Michigan and one in Nevada. These crushers are used to help produce cement, nickel, copper and iron. The Traylor 54" Gyratory has hourly capacities from 1400 to 2240 tons.



EIGHTEEN 42" Traylor Gyratory Crushers are in a wide range of service. One is in Chile, two in Canada and the rest dispersed over 14 different states. The 42" Traylor Gyratory provides capacities up to 1290 tons per hour.

FOR MORE INFORMATION
mail this coupon today to . . .

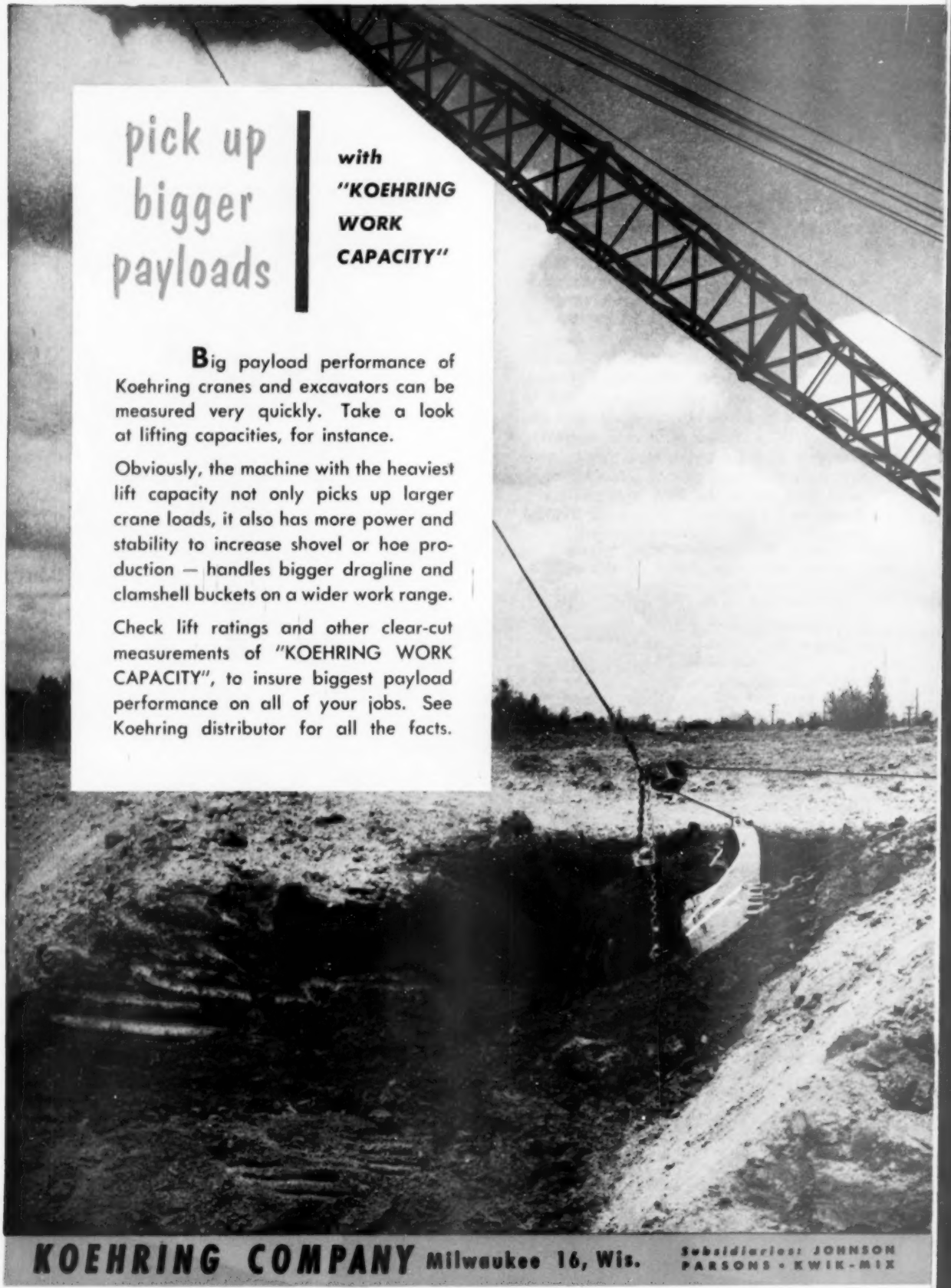
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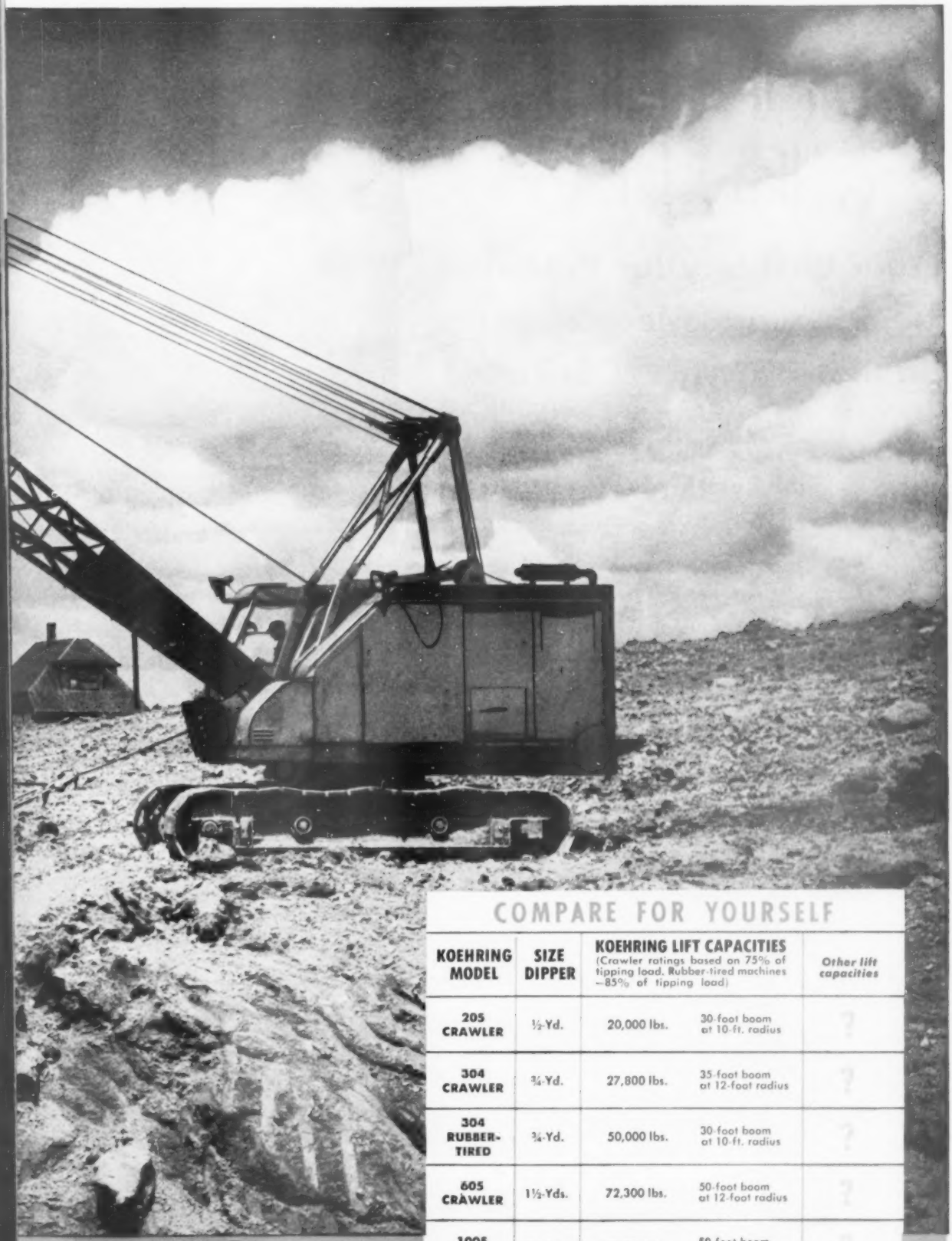
Send me complete facts about the Traylor TC Gyratory.

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Sales Offices: New York • Chicago • San Francisco
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9 Traylor has built 38 of the world's biggest crushers


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with "KOEHRING WORK CAPACITY"
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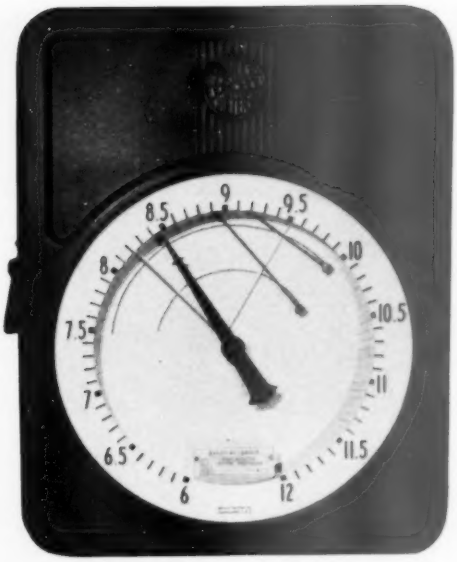


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304 CRAWLER	¾-Yd.	27,800 lbs.	35-foot boom at 12-foot radius	?
304 RUBBER-TIRED	¾-Yd.	50,000 lbs.	30-foot boom at 10-ft. radius	?
605 CRAWLER	1½-Yds.	72,300 lbs.	50-foot boom at 12-foot radius	?
1005 CRAWLER	2½-Yds.	159,000 lbs.	50-foot boom at 12-foot radius	?

K330

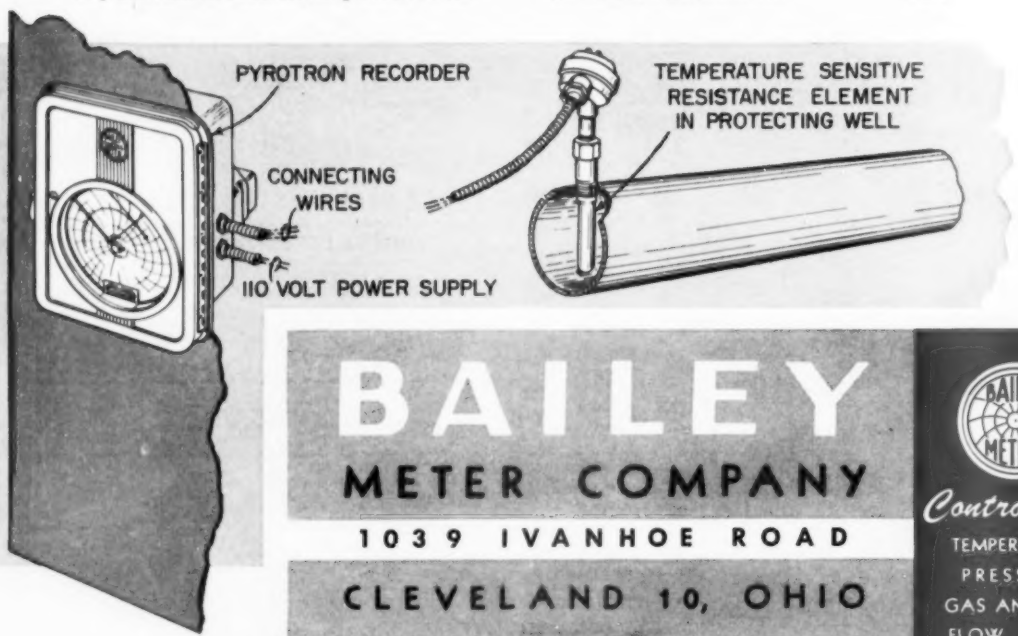
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- ✓ Resistance thermometer operation requires no standard cell, dry battery and cold junction compensator. Uses 115 volt a-c source. Strong signal and high precision of resistance element as compared to thermocouple makes possible the use of narrow range spans.
- ✓ The Bailey Pyrotron is calibrated at the factory and *remains* accurate; no periodic re-calibrations required. Since all elements are matched it is not necessary to calibrate each recorder to its element.
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Complete Controls for Process Plants

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Controls for
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GAS ANALYSIS
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NEW NO. 6 SHOVEL

"BOUGHT SIGHT UNSEEN... BETTER THAN I EXPECTED"



"I bought this machine sight unseen on Caterpillar reputation, and it does even better than I expected," says L. A. Scharringhausen of his new Caterpillar No. 6 Shovel. This versatile unit, shown working in a gravel bed near Palatine, Ill., stockpiles and loads gravel, and strips about six feet of clay overburden. Average load is three tons of gravel—ample proof that its two-yard bucket is conservatively rated.

Even with a full bucket load, the tractor will not "dance." It is designed as a unit, with the weight of the bucket distributed so that the full track length stays on the ground. "It balances much better than I ever expected," Mr. Scharringhausen says.

The operator sits high and well forward and has excellent visibility ahead and to all sides. With an honest 66 HP at the drawbar, the Cat* No. 6 Shovel has plenty of power to handle full two-yard loads. A 96" heavy-duty quarry bucket is only one of many optional items that can add still further to the Caterpillar No. 6 Shovel's usefulness.

Ask your Caterpillar Dealer to arrange an on-the-job demonstration of this new and popular addition to the line of dependable yellow machines. Find out for yourself why so many quarrymen are adopting this fast-maneuvering, clean-dumping Caterpillar unit. And remember, you can always count on your nearby dealer for prompt service and genuine Caterpillar parts.

Caterpillar Tractor Co., Peoria, Ill.

CATERPILLAR*

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NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

Here's how ROCKMASTER® eliminates toe




Ready for the shot. Initiation from bottom.

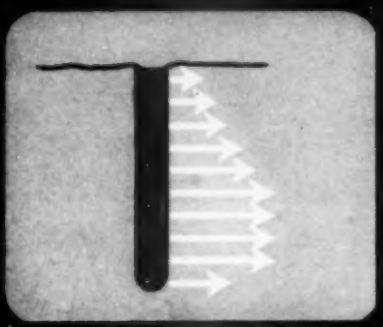

Blast under way. Toe starts to move out.


Peak of Blast. Explosive force well confined.


Burden starts to fall. Toe well out ahead.


Toe still leading. Fragmentation is good.


A well shot pile. Ready for easy digging.


Bottom initiation—burden moves straight out, no toe.


Top initiation. Force is "up and out," leaving toe.

IN THIS millisecond delay ROCKMASTER blast, 12 holes, 80 feet deep, spaced 20 feet apart were loaded with 9028 pounds of 75% Giant® Gelatin and Apex® No. 4 MV. ROCKMASTER detonators No.'s 1 through 12 were used and point of initiation was at the bottom of the holes.

Bottom initiation . . . at the point of maximum confinement . . . is an important point in eliminating toe. Look at the pictures. The toe moves out first and keeps moving, well ahead of the rest of the blast. At the start of detonation the entire column of explosives is confined by stemming. The full power of explosive force follows the line of least resistance toward the free face, directly into the burden.

With initiation from the top, the force again follows the line of least resistance, which is up and out. As the action moves progressively to the bottom, it is still "up and out." As it reaches the bottom, the toe is not subjected to the direct action that bottom initiation gives. The result is that the explosive force tends to jump and leave a toe.

Besides eliminating toe and cutting down on secondary shooting, the ROCKMASTER system gives you better breakage, reduces vibration and noise and gives you control over throw that means easy digging. For full details, ask your Atlas representative to show you the picture presentation of the ROCKMASTER story.

See the new Atlas movie, "The Inside Story," a technical discussion of Blast Hole Detonation. Make arrangements through your nearest Atlas Office.

ATLAS EXPLOSIVES

"Everything for Blasting"

ATLAS POWDER COMPANY,
WILMINGTON 99, DELAWARE

Offices in principal cities



Loads Aggregate or Big Blocks Quickly, Safely. Number one assignment for the Allis-Chalmers HD-15G is loading granite into trucks. Granite ranges from "turkey grit" to tombstones. Big blocks are scooped up quickly and safely in the 9-ft. 3-in.-wide bucket. Full hydraulic control enables the operator to ease heavy ones into truck beds with a minimum of shock.

HOW A 22-TON TRACTOR SHOVEL

Hustles All Phases of Production in a Granite Quarry

The purchase of a 3-cu.-yd. Allis-Chalmers Tractor Shovel has brought about a new, more efficient method of operation in a large Texas granite quarry. The versatile HD-15G, equipped with hydraulic front-end shovel and rear-mounted winch, now speeds all phases of production.

It scoops up all sizes of granite from fine aggregate to large blocks and loads it into trucks. It winches granite from inaccessible corners and drags 25-ton blocks to rail-mounted cranes for loading onto flat cars. Then, to round out its usefulness, it handles such miscellaneous jobs as building haul roads, laying rock on jetties, excavating for new construction, clearing land, stripping overburden and digging water reservoirs.

Ask your Allis-Chalmers dealer to show you how the HD-15G can help you meet the demand for greater output. Let him tell you, too, about the three other sizes of Allis-Chalmers Tractor Shovels from the 1-yd. HD-5G to the giant, 4-yd. HD-20G.

ALLIS-CHALMERS
TRACTOR DIVISION · MILWAUKEE 1, U. S. A.

Winches the Big Ones from Anywhere. With a mounted winch, the tractor drags largest granite blocks, weighing about 25 tons, from anywhere in the quarry to a rail-mounted crane. This method eliminates the expense of moving tracks so that cranes can reach granite. Winch also pulls smaller blocks from inaccessible corners to the Tractor Shovel bucket.



Handles Tough Excavating. Here is one of many jobs on which the Tractor Shovel demonstrates its powerful excavating ability. In order to assure a constant supply of water for buffers and other machines, the HD-15G deepens and widens a nearby reservoir. In addition, it digs ramps, handles cut and fill work for access roads and strips overburden from granite deposits.

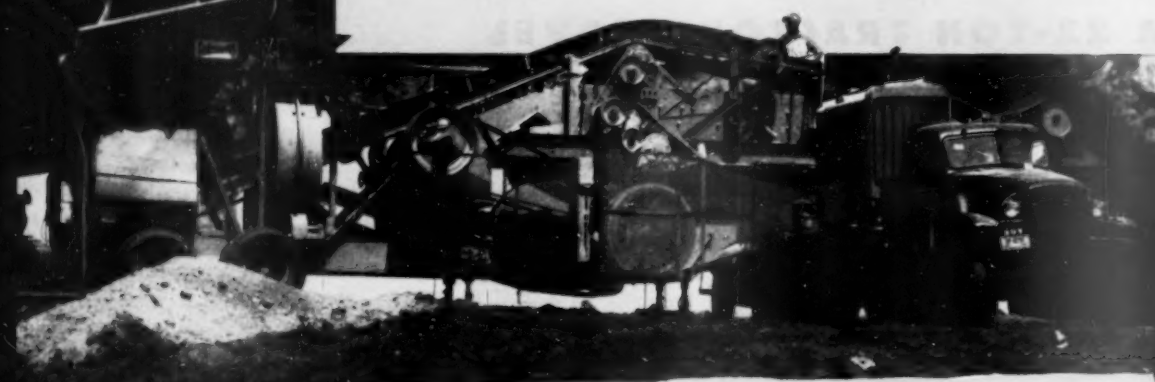


THINK BIG... THINK

WHEN YOU THINK GRAVEL PRODUCTION

IT'S up to you! You're the one who helps produce the billions of tons of crushed gravel needed to solve America's growing highway problem. Are you THINKING BIG about aggregate production . . . and the equipment that produces it?

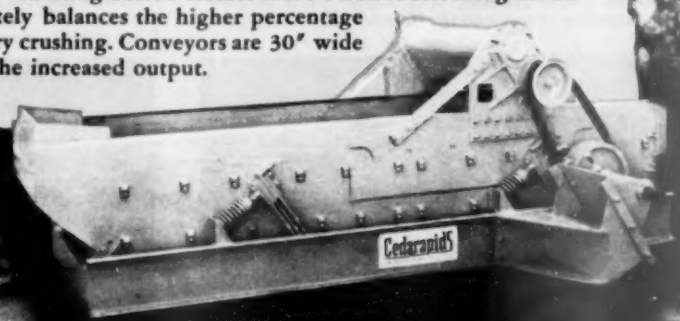
Cedarapids is the answer! Whatever your job, Cedarapids equipment is designed to turn out greater hourly tonnages than you thought possible . . . check with owners for proof! From 50 to 500 tons per hour, whatever you need, *and with no increase in operating and maintenance costs.* That's the way to think big about profits as well as production!



OPERATORS REPORT OVER 400 TONS PER HOUR WITH CEDARAPIDS COMMANDER PLANTS

420 tons per hour in North Dakota . . . 350 tons per hour in Minnesota . . . 250 tons per hour in New Mexico . . . 300 tons per hour in Wisconsin . . . and all with 15% to 40% crushing! There are dozens more high tonnage figures to show how the Commander "commands" the market.

In the opinion of many owners, the Commander is the answer to the kind of plant needed in the crushing industry for many years. The large 30" x 22' Roll Crusher increases secondary crushing capacity for really big output of fine crushed products. The big 48" x 10' Horizontal Vibrating Screen assures more efficient screening action and accurately balances the higher percentage of secondary crushing. Conveyors are 30" wide to handle the increased output.



CEDARAPIDS

WHEN YOU PRODUCE CRUSHED STONE

Big thinking about crushed stone production just naturally leads to "thinking Cedarapids". Check output figures of the big Cedarapids Double Impeller Impact Breaker, a powerhouse of production, if there ever was one, yet designed to cut per-ton costs to the bone. Ask owners about the performance of the Rock-It Crushing and Screening Plant, or special plants made with Cedarapids units designed to fit your specific requirements with the high profit output you dream of.

THINK BIG about production and profit on your next job . . . then check the coupon below for more information about the Cedarapids equipment you need . . . or see your Cedarapids distributor for complete details.



600 TONS PER HOUR AVERAGE PRODUCTION FOR THIS MODEL 5360S

This is the big Cedarapids Double Impeller Impact Breaker, formerly known as Model 5050, which averaged 600 tons per hour on the New Jersey Turnpike job, and hit a peak-day production record of 724 tons per hour! Here's a unit that really lets you *think big* in terms of production of the cubical shaped aggregate required in so many specifications today. And it holds operating and maintenance costs right at rock bottom! Because so much of the material is broken in suspension, there's 50% less contact of stone on metal. Wear is reduced and horsepower requirements are exceptionally low. High capacity and the high ratio of reduction mean a lower plant investment because much accessory equipment like secondary crushers, screens, conveyors, etc., is eliminated.

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U. S. A.

IOWA MANUFACTURING COMPANY • Cedar Rapids, Iowa, U. S. A.

Gentlemen: Please send literature and further information about equipment checked

- ☐ Gravel Plants
- ☐ Rock Plants
- ☐ Special Plants
- ☐ Horizontal Vibrating Screens
- ☐ Crushers
- ☐ Conveyors
- ☐ Washing Plants
- ☐ Bituminous Mixing Plants

Name _____

Company _____

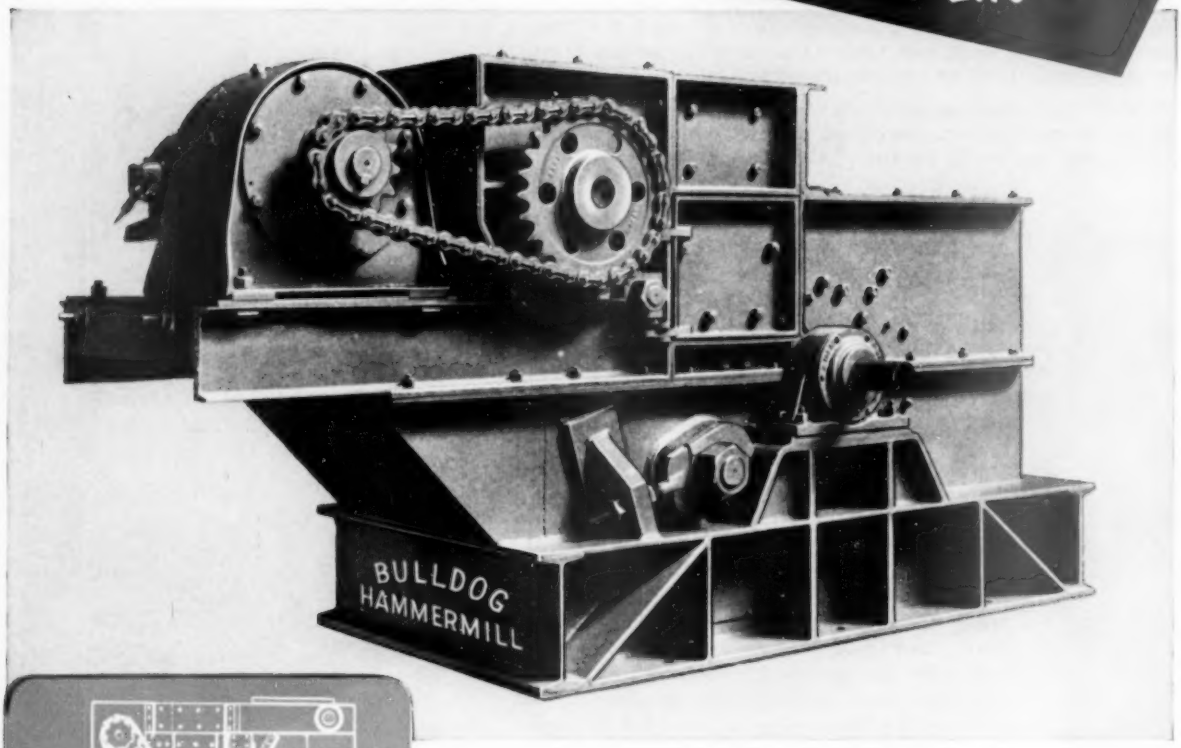
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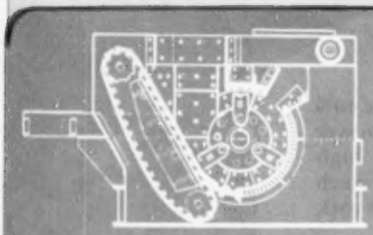
City _____ Zone _____ State _____

BULLDOG HAMMERMILLS

Assure Cement Plants.....

Twice the Capacity with 15 Times Longer Hammer Life*





Exclusive Traveling Breaker Plate Conveys Moist and Sticky Material to Hammers *Without Clogging*
1 to 1000 Tons Capacity

*ASK FOR PROOF OF MONEY-SAVING USES FOR PRIMARY, SECONDARY AND FINE REDUCTION

No hammermill offers as much production and operating efficiency as the BULLDOG! That's why operators who have checked them all know the BULLDOG'S exclusive non-clog feature of the Moving Breaker Plate reduces slow-downs and costly maintenance for high moisture materials. The Stationary Breaker Plate has no equal for dry materials. The BULLDOG Hammermill has the greatest hammer life of any hammermill. Write for Bulletin A today.

HAMMERMILLS, INC.

4700 WEST DIVISION STREET
CHICAGO 51, ILL. • SPaulding 2-9300

Subsidiary of PETTIBONE MULLIKEN CORP.

Choose the hoist with 9 lives...





CHOOSE HERCULES—Whatever the type or capacity of the next dump truck hoist you buy, the name HERCULES is your strongest guarantee of top performance and long life. From coast to coast, Hercules Hydraulic Hoists are favorites because they have earned the reputation of having 9 *lives*. Owners are continually amazed at the ability of Hercules Hoists to withstand severe use and to outlast other makes without repair.

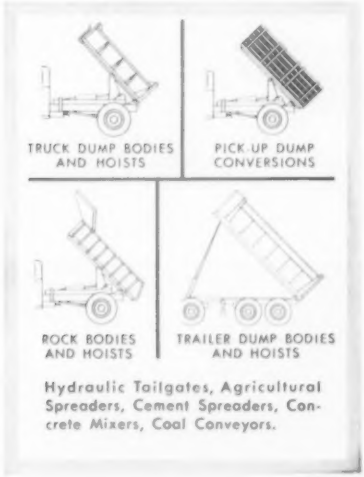
One of the famous Hercules Hoists is the Model 100 for 8 to 11 ft. dump bodies. Here are nine reasons why the Model 100 has nine lives, and why you should make it your next choice in this work range:

1. Takes more overloading.
2. No cramping nor strain on hinge bolts.
3. Lift arm design keeps body from tilting farther than intended.
4. No hoist stresses except direct lift transmitted to truck frame.
5. Uniform oil pressure.
6. Maintenance requirements are minimum.
7. Every part can "take it"—no Achilles' Heel.
8. Precision built of highest quality materials.
9. Rigidly inspected at every step of production.

BUY FROM THE LINE OF STRONGEST DESIGN

Hercules

HOISTS AND DUMP BODIES FOR EVERY NEED



Hydraulic Tailgates, Agricultural Spreaders, Cement Spreaders, Concrete Mixers, Coal Conveyors.

HERCULES STEEL PRODUCTS CORPORATION • GALION, OHIO

This *Continental* CONVEYOR does "Double Duty"

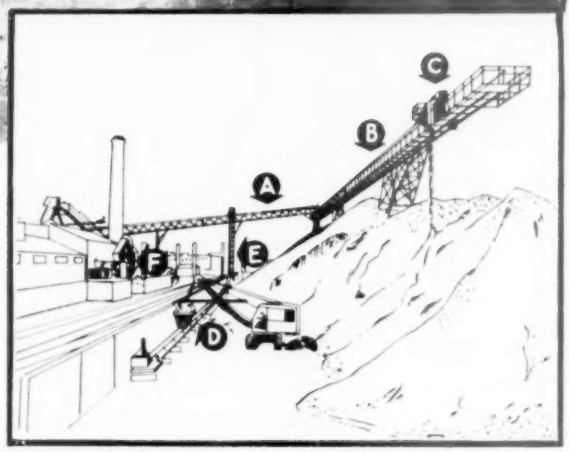


Another Example of Continental's Belt Conveyors at Work -

The Southern Cement Company's conveying and elevating system in their Birmingham Plant incorporates several advanced features of design—one of which is illustrated above and to the right.

Continental's engineers are skilled in "practical engineering" — the kind that results in installations designed for economical, dependable operation and long life. All Continental products — whether especially designed systems and equipment or standard equipment and accessories — show the value of practical engineering.

• *Call Continental engineers in on your job — or specify Continental on your next replacement order.*



Slag is carried to storage by Conveyors A and B and discharged to storage at any point by self-propelled Tripper, C. As material is needed for processing, it is loaded by shovel onto Reclaim Conveyor D, raised by Bucket Elevator E, and discharged onto return side of Conveyor Belt A., which delivers it to Plant F.

Write for your copy of Continental's new Catalog ID 481, "Continental Belt Conveyors."

CA4805

INDUSTRIAL DIVISION
CONTINENTAL GIN COMPANY
BIRMINGHAM, ALABAMA

ENGINEERS CGC ATLANTA • DALLAS • MEMPHIS • NEW YORK CGC MANUFACTURERS

It's the 1 yd. Jaeger LOAD-PLUS



Note how weight of machine and pressure on bucket converge on the driven front wheels. Torque converter drive enables operator to apply any power needed in one fast, smooth build-up, without shifting. It's shock-free, too.

Horizontal thrust of the hoisting pistons crowds the bucket 13" forward into the pile.



Power-steered rear axle whirls loader in only 14' radius. 5-speed transmission and instant directional shift take it from there — up to 18.7 mph forward, 28.2 mph reverse.

Engine at rear counterbalances loaded bucket. It's stable.



Longer reach (21"), at higher dumping clearance (8' 2" under bucket lip, 10' 1" under hinge). Boom arms and bucket under finger-tip control.



Loader operators take to this machine like ducks to water. *They helped design it.* Catalog L100-3 will tell you why. Send for it today.

THE JAEGER MACHINE COMPANY

603 Dublin Avenue, Columbus 16, Ohio

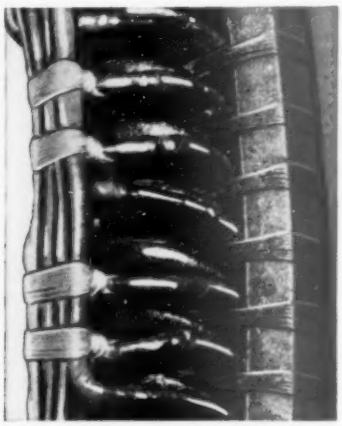
AIR COMPRESSORS • PUMPS • MIXERS • TRUCK MIXERS • PAVING MACHINERY



A G-E SYNCHRONOUS MOTOR, matched to your ball mill, is modern in design, neat in appearance, and built to give years of safer, more dependable service. Strength and rigidity are assured by fabricated construction and careful annealing of steel in rotors. Special coil and connection reinforcement gives extra protection to withstand the vibration and shock inherent in ball-mill operation.



END SEGMENTS are sectionalized and securely bolted between poles. This rugged squirrel-cage winding assures more than ample strength for long motor life.

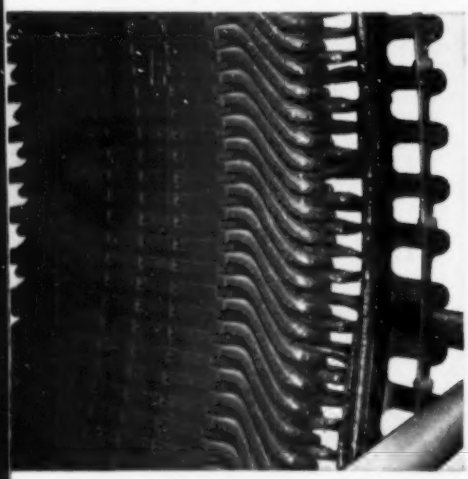


ARMATURE COILS are securely laced to an insulated support ring which, in turn, is rigidly attached to the stator frame.



G-E Synchronous Motors Specially Designed

RAPID, ROUTINE MAINTENANCE MEANS LESS DOWNTIME BECAUSE . . .



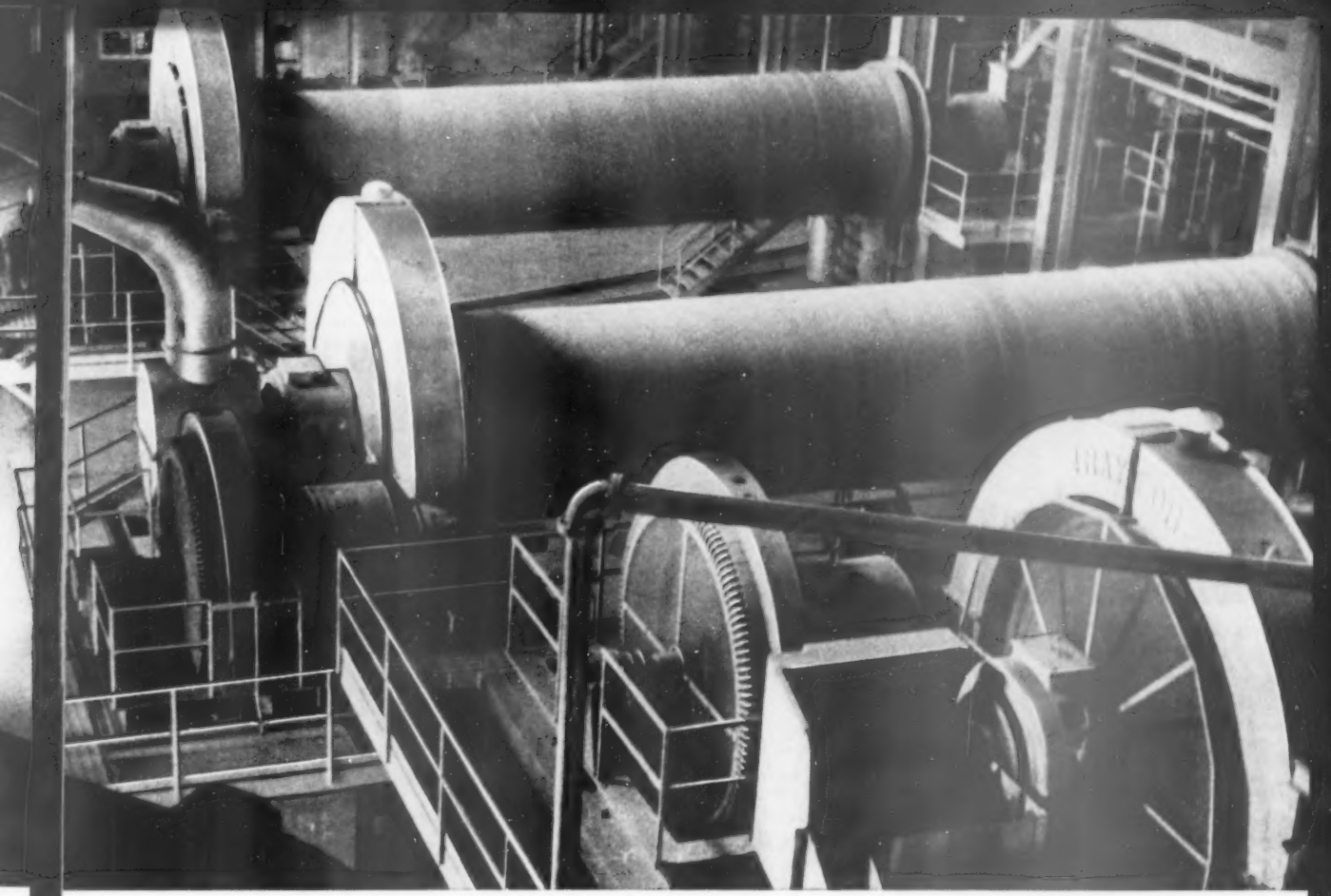
1 GLOSSY VARNISH on windings acts as moisture barrier, resists dust adhesion, cleans easily. Clean windings mean longer insulation and machine life.



2 BRUSH-PRESSURE ADJUSTMENT is fast and easy with spring-loaded holder. Brushes are staggered for uniform wear giving maximum collector-ring life.



3 SNAP-TOP COVERS and sight gage make lubrication fast and sure. These convenient features encourage regular checking of oil-level.



THREE G-E TYPE-TS, 180-RPM SYNCHRONOUS MOTORS DRIVE TRAYLOR BALL MILLS AT IDEAL CEMENT CO., PORTLAND, COLO.

for Dependable, Economical Ball-mill Service

Ball mills are one of industry's "tough" drive applications. Motors must be able to meet torque requirements, withstand vibration, and run long periods without shutdown.

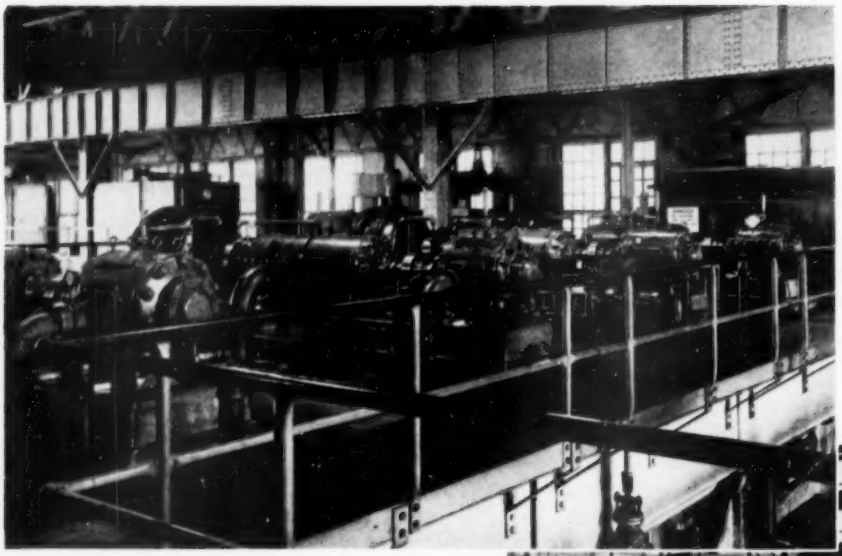
G-E synchronous motors are literally tailor-made to meet these requirements. Engineering and manufacturing experience obtained in building hundreds of motors for ball-mill drives and the proved dependable performance of G-E synchronous motors on all types of heavy-duty applications assure you of a motor that will withstand unusual demands and require only a minimum of maintenance expense.

Be sure to evaluate the special design features of G-E synchronous motors when you consider your next ball or rod-mill drive.

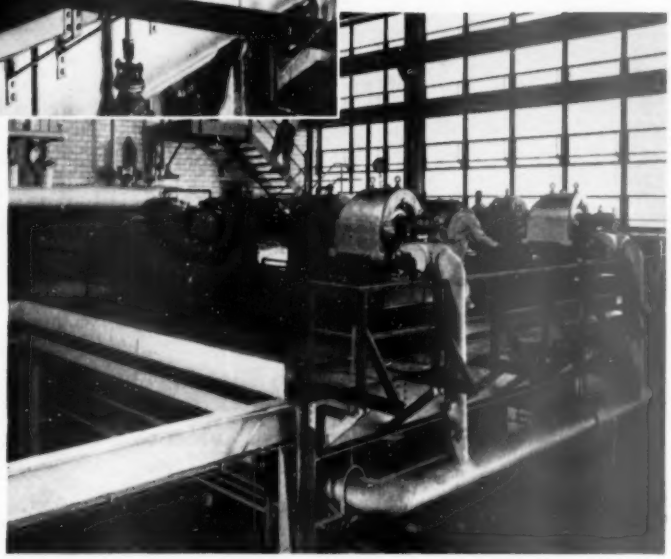
Contact your nearest General Electric office for bulletin GEA-5959—*Synchronous Motors for Ball and Rod-Mill Drives* or write to Section 770-30, General Electric Company, Schenectady 5, N. Y.

You can put your confidence in—

GENERAL ELECTRIC



Views of Fuller Rotaries installed on balconies; overhead, out of the way. Left: Four two-stage; capacity each 1665 c.f.m., 100-lb. psig. Below: Two two-stage; capacity each 1592 c.f.m., 120-lb. psig.



Eliminate heavy, costly foundations with FULLERS

*** simple * compact**

*** direct drive * valveless**

*** vibrationless * pulseless**

If you've never considered the many outstanding advantages of Fuller Rotary Compressors and Vacuum Pumps, now is the time to do so.

Fullers have many unique and beneficial advantages for low cost operation. They can be placed almost anywhere out of the way, because their vibrationless, rotary action permits installation, for example, on a balcony or upper floor of a building . . . no heavy, costly foundations being required. Operated by direct drive, you reduce initial and maintenance costs, as well as transmission losses incident to gear and belt drives.

Because Fuller Rotaries compress without reciprocating motion the air-stream is, in effect, non-pulsating. They're extremely compact for volumes delivered; sizes are available to deliver up to 3300 c.f.m., actual free-air, for pressures to 125 psig., from atmosphere.

Write today to Fuller Company—have one of its compressor engineers recommend the *right* compressor for your operation—one that will give you life-time efficiency and capacity.

Fuller Pioneers of high efficiency vane-type rotary compressors

FULLER COMPANY
Catasauqua, Pa.

Branch Offices: Chicago • San Francisco • Los Angeles • Seattle • Birmingham

C-239
2156

HERE'S WHY



this remarkable Rear-Dump belongs in your present fleet

Hauls anywhere . . . Tournarocker is a new kind of haul unit, with simpler, more rugged construction than conventional heavy-duty haulers. It carries capacity loads over rough mine and quarry haul roads, or cross-country . . . goes anywhere track-type equipment goes. And, it stands up to tough work on steep grades with a minimum of maintenance.

Reduces maintenance . . . because Tournarocker has no hydraulics, high-pressure jack lines, long drive shafts, frame, sub-frame, springs, or tie rods, the most common troubles of other rear-dumps are eliminated. Large single tires have no divided face to collect rock fragments that wedge in, wear and tear. Three-layer, grid-type bowl with tool-steel floor resists shock of dumped-in rock.

Cuts weather delays . . . Giant tires increase flotation. There are no small idler steering wheels to rob power and traction. Tournamatic differential applies extra power to drive wheel on firmest footing . . . pulls unit through mud, sand, and snow which stop ordinary hauling units.

Speeds loading . . . Excavator operator gets faster load cycles because he has a wide top opening for a target. He gets less spillage which saves clean-up work. He swings in and out faster because of wide low entry at rear of body.

Saves spotting time . . . 90° turns and positive power steer quickly position "big-target" body under dipper. No switching back and forth or turntables necessary.

Cleans load every time . . . Even in sticky clay, Tournarocker dumps clean. Streamlined body sheds material readily . . . none rides back to excavator to steal payload room on next trip. Induction body heating available for winter work.

Works fast in tight quarters . . . push-button power steer, 90° turns, electric controls, plus multi-disc air brakes that have more braking surface on a *single* wheel than most hauling units have on *all four*, all contribute to fast, safe haul.

Reduces dumping time . . . a touch of electric switch activates hoist motor. Body lifts smoothly for instant dump. You get "power up" and "power down". There's no delay for hydraulic pressure to build up . . . no shock loads of free gravity dump. Powerful braking action of 4-wheel disc air brakes lets operator back up fast to edge of fill.

Saves clean-up . . . front-wheel drive and powerful brakes make it easy for operator to spot safely for dump over edge of bank or into hopper. Body swings behind and below rear wheels, dropping entire load completely over the edge, and greatly reducing clean-up.

Design provides comfort . . . and safety for operator. Big low-pressure tires and air-foam cushion seat smooth out bumps . . . cut the "up-and-down ride" for driver. Push-button controls on instrument panel activate electric motors at point of action. Heavy manual work fighting steering wheel and control levers has been eliminated. Operator dumps, steers, shifts electrically. Fatigue factors are greatly reduced.

Improves safety . . . Low center of gravity, high clearance, good visibility, big brakes, front-wheel drive, giant tires, big top opening and ease of control, all help make Tournarocker the leader in hauling safety.

Insures future savings . . . Behind the 2-wheel Tournarocker prime-mover, you can interchange a scraper, bottom-dump, crane, or flatbed. Any of these trailing units are available at about 25% of initial cost. With them, you can always fit future operations, insure bigger annual savings.

Tournarockers available in 9, 18, 35, and 50-ton sizes.

The purchase by Westinghouse Air Brake Company of R. G. LeTourneau, Inc., brings together world-leading earthmoving know-how and precision manufacturing and research experience. You can buy from this strong new company with even greater confidence than before.

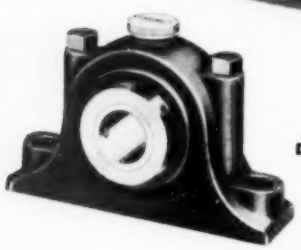
Tournarocker—Trademark Reg. U.S. Pat. Off. R-406 G-bw

LeTourneau-Westinghouse Company

PEORIA, ILLINOIS

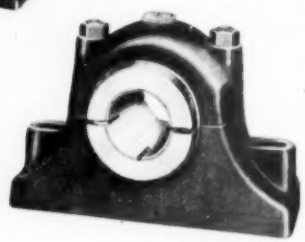


TYPE "E"



DOUBLE INTERLOCK

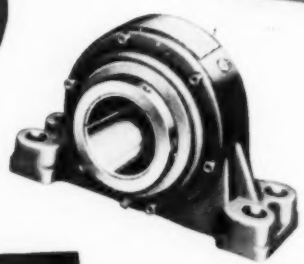




TYPE "C"



SPECIAL DUTY



ALL-STEEL

Known 'round the World for Dependability —

DODGE-TIMKEN

★ In millions of installations Dodge-Timken bearings have proved their ability to cut costs and increase production. Their dependability is unquestioned under every condition of service. Available in five different types, including the new Dodge-Timken All-Steel Pillow Block for grueling, heavy duty jobs. All are sealed both on and off the shaft.

Dodge-Timken bearings are fully assembled and lubricated — ready to lock on the shaft. They are normally available from distributors' stocks . . . in a wide range of sizes. Call your distributor or write us for Dodge-Timken bulletins.

DODGE MANUFACTURING CORPORATION
2600 UNION STREET, MISHAWAKA, INDIANA

DODGE
of Mishawaka, Ind.

1878 DODGE 1953 75th ANNIVERSARY

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory-trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone book.





TORQUE-ARM SPEED REDUCERS



ROLLING GRIP AND DIAMOND D CLUTCHES



TAPER-LOCK SHEAVES; SEALED LIFE V-BELTS

For TOUGH jobs with years of work ahead...



MARION 111-M Ward-Leonard Electric shovel owned by the Hydro-Electric Power Commission of Ontario, making a cut for an open canal and recovering aggregate for concrete work.

MARION 111-M
Ward-Leonard Electric

Rock and ore have a way of making things rough for an ordinary shovel.

The machine may win, in the first few months, over the stubborn resistance of shot rock. But it still faces the test of time, for rock and ore "wear down" an ordinary shovel and break its spirit.

It's on the tough jobs, with years of work ahead, that the MARION 111-M Ward-Leonard Electric shovel has a chance to prove its real worth. Today this MARION is winning the battle of the rock pile and the ore pit on many a front.

Its victories mean greater production, lower operating cost, less maintenance expense and fewer work stoppages. Its powerful electric muscles and the shock-tested members of its frames and machinery assemblies are making owners say, "This is it!"

It doesn't cost anything to find out what the 111-M Ward-Leonard Electric can do for you. Your nearest MARION office will be glad to give you the facts.

MARION POWER SHOVEL CO.
MARION, OHIO, U. S. A.

OFFICES AND WAREHOUSES IN ALL PRINCIPAL CITIES

from 3/4 cu. yd. to 45 cu. yds.

GREATER OUTPUT AT LOWER COST

with LIMA type 1201

3 or 3½ yd. capacity



If you are faced with the problem of maintaining profits despite continually rising labor and other costs, you will find a solution in the LIMA Type 1201 shovel, crane and dragline. Here is a machine capable of *peak production* day after day with greater efficiency, fewer delays and less operator fatigue. LIMA shovels, cranes and draglines are especially designed and built for the jobs requiring high output at low cost.

A LIMA representative will gladly show you how a LIMA Type 1201 *can cut costs on your operations. The LIMA line includes shovels ¾ to* 6 *yards, cranes to* 110 *tons, and draglines variable.*

LIMA

SHOVELS • CRANES
DRAGLINES • PULLSHOVELS

BALDWIN BLH LIMA-HAMILTON
Construction Equipment Division

BALDWIN-LIMA-HAMILTON CORPORATION
Construction Equipment Division
LIMA, OHIO, U.S.A.

"Attach the detonating cap properly . . . Primacord will do its job safely, effectively

"This is the last job before the blast. Holes are loaded with a branch line in each one. You've laid your trunk line and connected your branch lines at right angles to it. Men and machines have been removed. You've checked and double-checked – everything's ready.

"*Now* attach the detonating cap to the Primacord. Up to this point, your blast – hooked up with Primacord – cannot be set off by sparks, friction, ordinary shock or stray electric currents. Primacord *must* be detonated with a blasting cap attached to one end of the trunk line.

"Place the cap and fuse alongside the end of the Primacord trunk line and bind together lightly but firmly with friction tape. Don't tie them together with string or wire – don't lay them under a rock! Place the cap gently on the ground and lay out your length of safety fuse*.

"Remember – in blasting, safety is a sign of skill. Be careful, all-ways."



Ask your explosives supplier, or write for further facts to

THE ENSIGN-BICKFORD COMPANY
Simsbury, Connecticut
Also Safety Fuse since 1836

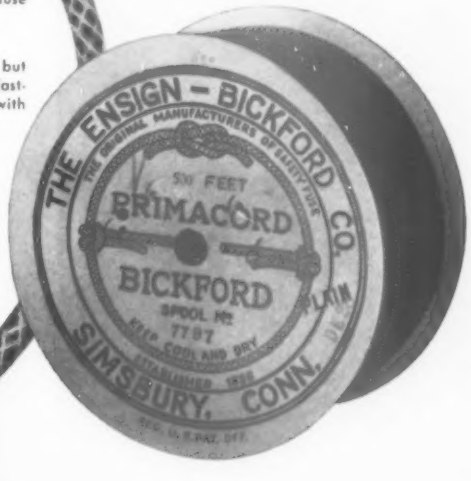
* Primacord can also be detonated with an electric blasting cap.



1. Cut the Safety Fuse squarely across with a clean, sharp knife to expose the powder core. Be sure you cut the fuse long enough, because a little more fuse is a lot more safety.

2. Seat this freshly cut end lightly but firmly against the charge in the blasting cap, and crimp cap onto fuse with a crimping tool.

3. Lay the Safety Fuse and its cap alongside the end of the Primacord trunk line, and bind lightly but firmly together, using friction tape. Place the cap gently on the ground and lay out your length of Safety Fuse.

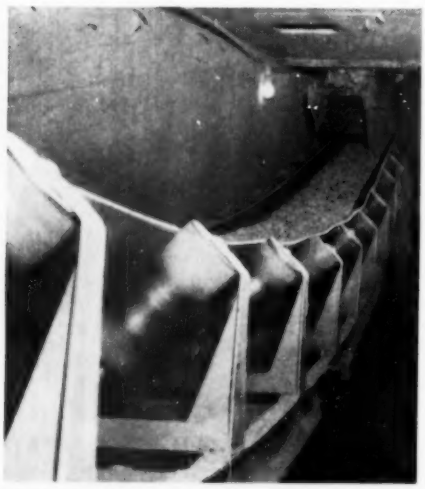


Use PRIMACORD®

The PROVED and APPROVED DETONATING FUSE



Stockbridge Stone Co. finds that **Extra flexibility of belt reinforced with "Cordura" permits 45° idlers . . . speeds production**



Reinforced with Du Pont "Cordura", this 527 ft. long, 30 in. wide belt operates almost constantly during an eight-hour, six-day working week. Although subject to dampness, cold and dust, it has been in service for six months with no maintenance.

To increase loading capacity . . . cut loading time . . . speed production, the Stockbridge Stone Co. of Georgia installed a main conveyor belt operating on 45° troughing idlers. Reinforcement with Du Pont Cordura* gives this belt extra strength . . . plus extreme lateral flexibility required by the unusual troughing angle. Operators of the quarry report that the belt—manufactured by Raybestos-Manhattan, Inc.—shows no sign of wear after 6 months of operation.

Belts sinewed for strength with "Cordura" trough and train better. And the extra strength and low stretch of "Cordura" means less downtime for take-ups, resplicing. Loaded or empty, these belts ride firmly on the center idler.

Find out more about the advantages of belts reinforced with Du Pont "Cordura". Write for names of suppliers, and for your copy of the free booklet: "Sinews for Industry." Address: Textile Fibers Dept., Room 2520-R, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.

*REG. U. S. PAT. OFF.

Du Pont "Cordura" High Tenacity Rayon

STRENGTH AT LOW COST

DU PONT

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Get all 4 and MORE

WITH A UNIVERSAL 880 SENIOR "R" GRAVELMASTER

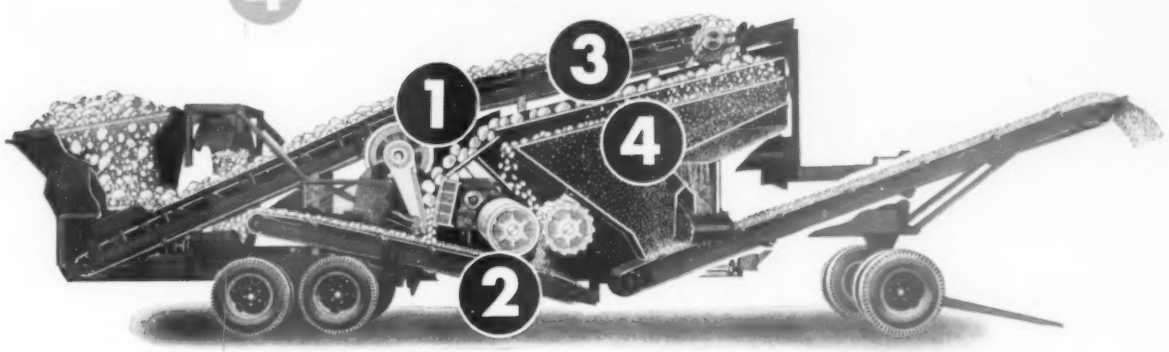
FOR THE FIRST TIME — 4 PLUS - PROFIT ADVANTAGES IN A PORTABLE PLANT DESIGNED TO MEET HIGHWAY WEIGHT LIMITS

1. **1036 ROLLER BEARING JAW CRUSHER.** Famous Universal overhead eccentric action. The industry's finest for 47 years. Two distinct crushing blows, force feed and fast discharge for top capacity.

2. **3024 ROLL CRUSHER,** roller bearing star gear drive. Designed to utilize full 24" width for top secondary crushing capacity.

3. **30" CONVEYORS,** top carrying capacity, rugged channel frame construction. Permanently lubricated troughing and return roll bearings.

4. **FULL 48 SQ. FT. OF SCREENING AREA,** 4' by 12', 2½ deck screen . . . Inclined mounting for top capacity.



. . . AND MORE

- **PORTABILITY --** Designed to meet State weight limits . . . less moving time, more production time.
- **DEPENDABILITY --** Universal's time-tested, job-proven engineering cuts down time, keeps production rolling.
- **CAPACITY --** Big jaws, rolls, screen and conveyors balanced and coordinated to produce maximum tonnage under a wide range of pit conditions. Result — top profits!

For full information regarding Universal's complete line, see your nearest Universal distributor or write Universal Engineering Corporation, 617 C Ave. N.W., Cedar Rapids, Iowa. Universal is a subsidiary of Pettibone Mulliken Corporation, 4700 W. Division Street, Chicago 51, Illinois.

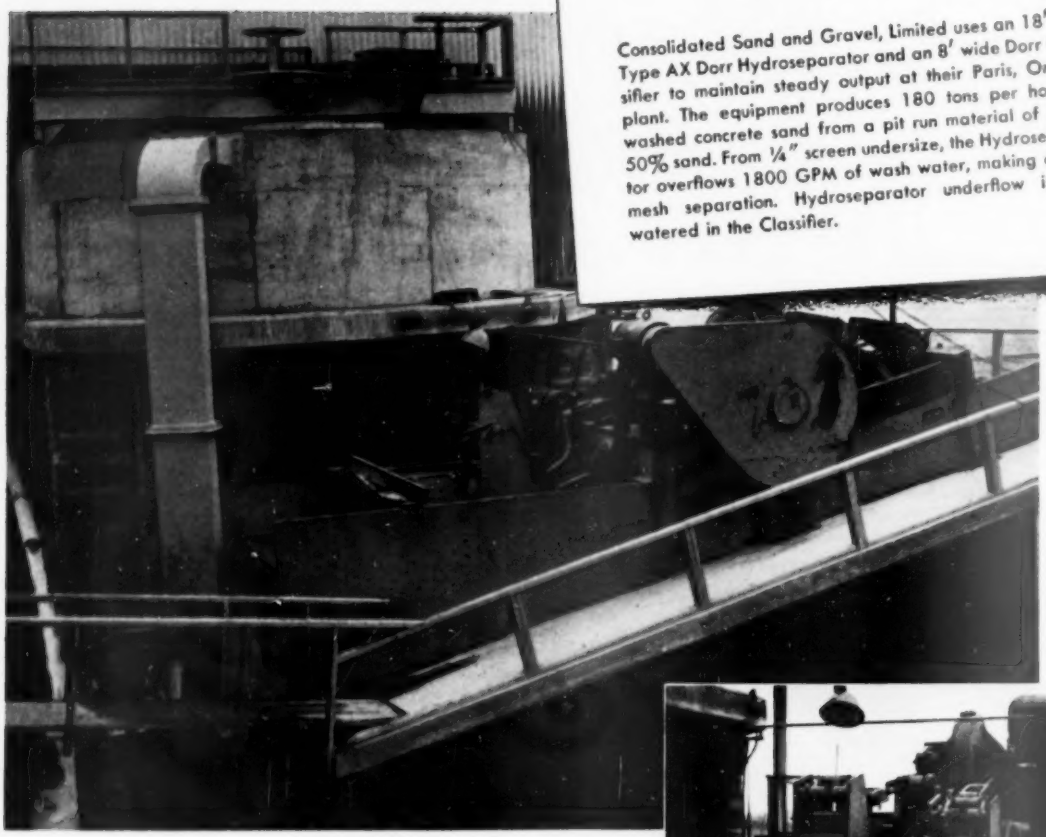
When you move, move quickly and easily with Universal Portable Plants AND YOU MOVE ON TO GREATER PROFITS.

ENGINEERED FOR TOP OPERATING PROFITS

UNIVERSAL GAVE CEDAR RAPIDS ITS ORIGINAL FAME FOR QUALITY CRUSHERS

IN CEDAR RAPIDS SINCE 1906

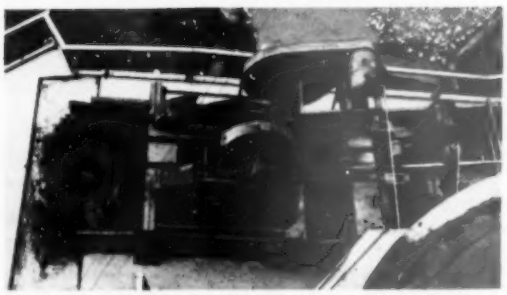
PMCP UNIVERSAL



Consolidated Sand and Gravel, Limited uses an 18′ dia. Type AX Dorr Hydroseparator and an 8′ wide Dorr Classifier to maintain steady output at their Paris, Ontario plant. The equipment produces 180 tons per hour of washed concrete sand from a pit run material of 40 to 50% sand. From ¼" screen undersize, the Hydroseparator overflows 1800 GPM of wash water, making a 150 mesh separation. Hydroseparator underflow is dewatered in the Classifier.



View of overflow end of Dorr Classifier.



Classifier rake discharge . . . produced in well drained condition for stock piling.

In Canada, too...

Steady Sand Production

—year in and year out

Whether your tonnage requirements are large or small, Dorr equipment keeps your production going. When you want equipment that *stays on the job* and keeps you away from high maintenance costs, get in touch with Dorr.

Ask a Dorr engineer for the facts about equipment scaled to fit your specific needs. THE DORR COMPANY, Stamford, Connecticut. *In Canada:* 26 St. Clair Ave. E., Toronto 5.

Better tools TODAY to meet tomorrow's demand

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WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT

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drill holes faster

– get greater footage, better fragmentation, lower costs



Use a

Le Roi-CLEVELAND

T286 Self-Propelled Dual Drill Rig

It's 2 Le Roi-CLEVELAND patented air feeds and drills with air-motor booms mounted on a 25-hp tractor

3 speeds forward . . . 1 speed reverse



One Le Roi Airmaster 600 cfm Compressor provides all the low-cost air you need to operate the T286 Dual Drill Rig, when it is equipped with Le Roi-CLEVELAND 4" drifters. A smaller compressor is sufficient, when the T286 is equipped with the 45-lb. H10 or 80-lb. H23 (3⅛"-bore) sinker drills or 3½"-bore D25 drifter.

WITH a Le Roi-CLEVELAND T286, your man *drives* where he wants to go — over almost any kind of ground — and tows the compressor right along.

He drills and cleans holes as deep as 30' — in any direction — at any angle — with less air.

Have your nearby Le Roi distributor show you how this all adds up to faster drilling, better hole spacing, greater footage, better fragmentation, lower costs.

Write for Bulletin RD-21.

C-143

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A Subsidiary of Westinghouse Air Brake Co.

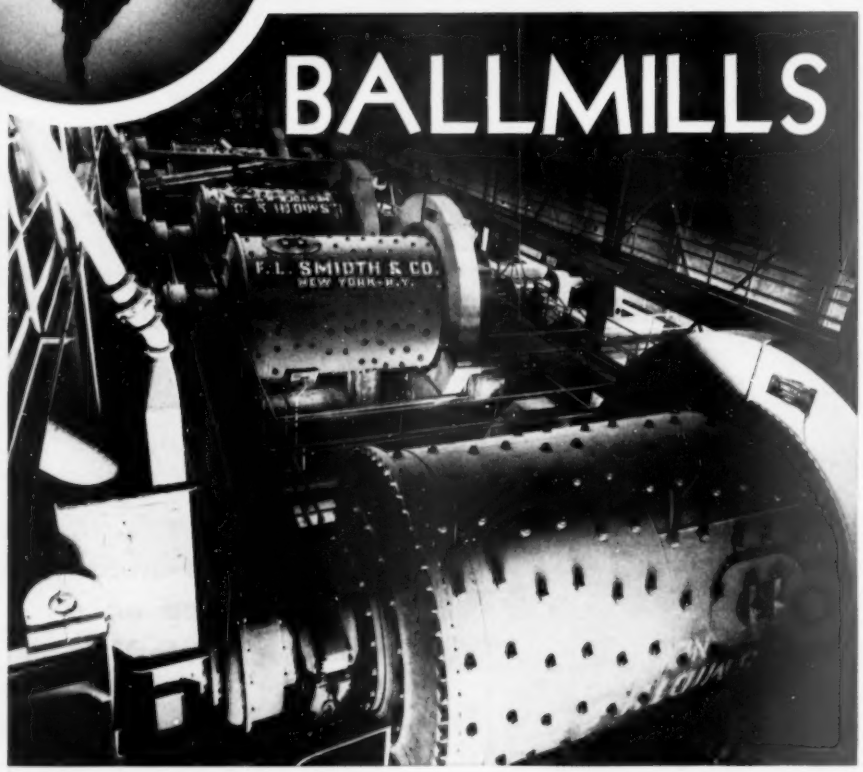
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"WE HEAR..."

October, 1953

The General Services Administration recently announced that it is extending its mica purchasing program to include acceptable "nonruby" or "green" mica. Up to now, the government has confined its purchases to ruby mica, for which it pays from $2 to $70 per lb., depending on type and quality. Under the new purchasing plan, the government will pay from $1.60 to $56 per lb. for nonruby mica that can meet form, color and size requirements, and which can pass a so-called "Q-meter" electrical test. G.S.A. stated that it is enlarging the program because its 25,000-ton goal for purchase of mica for domestic as well as stockpile use is only 6 percent complete. Miners who want to participate in the program have until June 30, 1954, to notify G.S.A.

* * * * * * * * * *

After reaching an all-time high in August, construction costs dipped slightly in September, as reported by Engineering News-Record. The decrease was due primarily to a slight reduction in lumber prices reported in ten of the 20 cities covered by the Engineering News-Record indexes. The Construction Cost Index for September was 610.17 (based on 1913=100), a 0.3 percent decrease from August, but a 4.1 percent increase over September, 1952. The Building Cost Index for September of this year was 436.24 (also a 1913 base), or 0.2 percent below August and 2.8 percent higher than September, 1952.

* * * * * * * * * *

A $13,000,000 silicone plant is being built at Long Reach, W. Va., by the Linde Air Products Co., division of Union Carbide & Carbon Corp. The first producer of the product was Dow-Corning Corp., followed by General Electric Co. The Linde company has been producing silicones on a small scale at Tonowanda, N.Y. Among the industrial uses of the product are in water-repellent materials, heat-resistant paints, electrical insulation, lubricants, automobile polishes, and for coating molds and bakery pans to keep materials from sticking. Silicones are made from sand or quartzite, combined with petroleum chemicals.

* * * * * * * * * *

Total highway construction for 1953 will involve a capital outlay of approximately $5,453,000,000, the largest highway budget on record, according to the Bureau of Public Roads. This compares with highway expenditures of $5,014,-000,000 for 1952 and $4,541,000,000 for 1951.

* * * * * * * * * *

Ohio River freight movement, on the 981-mile inland water route between Pittsburgh, Penn., and Cairo, Ill., is expected to set new records in 1953. New records were also set in 1952 when industry moved a total of 10,362,200,936 ton-miles of freight, compared with 9,760,287,508 ton-miles in 1951. Tonnage was down slightly in 1952 but longer hauls more than made up the difference. Tonnage amounted to 56,549,863 tons in 1951. The 1953 figure is expected to pass the 60,000,000-ton mark, with a 75,000,000-ton year predicted by 1960. Stone and gravel shipments reached a new high of 10,631,886 tons in 1952. Other large shipments were in the coal and coke, petroleum, chemical and steel industries.

* * * * * * * * * *

Another discovery of the remains of the ancient past was recently unearthed at a sand pit near South Bend, Neb. Four huge teeth, believed to be from an early ancestor of the hippopotamus or elephant, which roamed this continent about 15 to 20 million years ago, were discovered by Jason Streight, Western Sand & Gravel Co. The teeth were pumped up from a sand pit 60 ft. deep. It was believed that the animal may have been trapped and died in an ancient stream at the spot where the teeth were found, or the teeth and the gravel were carried there from quite a distance by glaciers or water. The fossil teeth were said to be remarkably preserved. The enamel apparently had been replaced or coated with a harder mineral deposited by water.

WE HEAR

The construction boom is being reflected in the hotel industry. For the first five months of this year, a total of $28,000,000 was spent on 1067 big and little hotels, indicating a year second only to 1950 when new hotel construction amounted to $84,000,000, as reported by Architectural Forum. This, however, is only a small amount of the expected new construction. Hotel association surveys during the first six months of 1953 have revealed plans for a total of $153,000,000 for new construction. Remodeling and modernization outlays are going on at even a much higher rate. The American Hotel Association has placed remodeling outlays in the last five years at $2½ billion, while current modernization is at the rate of $500,000,000 per year.

* * * * * * * * * *

Two former New York State employes were recently convicted of a charge of conspiring to accept illicit fees for obtaining state approval of samples of sand and gravel submitted by contractors. The indictment charged that the one defendant, who took part in the sand and gravel testing, arranged with his accomplice to contact pit owners to arrange for accepting bribes in connection with grading the samples. Both defendants pleaded guilty to the charge and were fined $500 each. Eight other counts against them were dismissed on the motion of the special prosecutor who had been appointed to investigate alleged irregularities in sand and gravel purchases.

* * * * * * * * * *

Ohio's $326,000,000 turnpike was over 42 percent under contract as of September 1, and the entire 241-mi. project is expected to be contracted for by December 18, as recently reported by the turnpike underwriters. Total awards issued through September 1 amounted to $89,773,536, which is 0.02 percent above the original engineering estimate made August 15, 1951. Current plans reportedly call for a final cost approximately 2.9 percent below original expectations. It was also reported that the turnpike commission, as of August 21, either owned or had entry to 79.6 percent of the main line of right-of-way required for construction and that it is expected that almost all of the right-of-way will be secured by the originally scheduled date of January 1, 1954.

* * * * * * * * * *

Two Dresden, Ohio, industries reportedly are being seriously affected by a drop in the water level of the Muskingum River, north of Ellis dam, due to a washout beneath the dam. The two companies involved are the Zanesville Gravel Co., and the Dresden Paper Mill, each of which uses approximately 1000 gal. of water per min. in its operations. If the water level continues to drop, these operations may be forced to shut down as water from wells could not be obtained in sufficient quantities to continue operation.

* * * * * * * * * *

Heavy construction awards, nationally, totaled $11,121,233,000 for the first 38 weeks of 1953, as reported by Engineering News-Record. This was a decrease of 7 percent from the $11,938,859,000 construction awards for the corresponding 1952 period. The decline in volume is mainly limited to federal work-A.E.C. as well as other types of federal construction. Private construction and state and municipal work, on the other hand, are setting new all-time highs.

* * * * * * * * * *

Fertilizer use is predicted to make new gains in 1954, due to the 1954 wheat crop curbs. The increased use would spring from the grower's effort to make up the wheat production loss resulting from acreage cuts. Also, plant food spreading this year is expected to top last year's record.

* * * * * * * * * *

Railroad expenditures for new construction in the first seven months of 1953 amounted to $254,000,000, compared with $237,000,000 for the same period of 1952, according to a Labor and Commerce Department report. Railroad expenditures for the month of July totaled $43,000,000, compared with $41,000,000 in June and $38,000,000 for July of the preceding year.

* * * * * * * * * *

A specially constructed concrete room is being built at the Cleveland, Ohio, Clinic to house the radioactive cobalt "ray-bomb" to be installed at the clinic next year for use in cancer treatment. The 20-ft.-sq. room will have 30-in. thick concrete walls. The cobalt, which now is being made radio-active at the Oak Ridge, Tenn., A.E.C. plant, reportedly will produce rays equal to those of a 3,000,000-volt X-ray machine.

THE EDITORS



This Simplicity screen has already produced 6,150,000 tons limestone!

Simplicity Model D Double Deck Screen at McDonough Bros. Stone Company helps produce specially prepared limestone for metallurgical applications

This 4′ x 12′ Simplicity Double Deck Screen at McDonough Bros. Stone Company in San Antonio, Texas, has already produced more than six million tons of metallurgical limestone. And it's still going strong. A 24″ belt conveyor, running at 600 feet per minute, delivers 300 to 400 tons of limestone an hour to a crusher. Then the Simplicity Gyrating Screen separates the plus 4½″ material on the top deck and the plus 2⅝″ material on the bottom deck. Simplicity Screens, like those in operation at McDonough Bros., can help insure fast, accurate sizing and processing in your plant. And the simplified power and operating mechanism of Simplicity equipment helps keep maintenance costs down. For complete information, consult a Simplicity sales engineer or write us today.

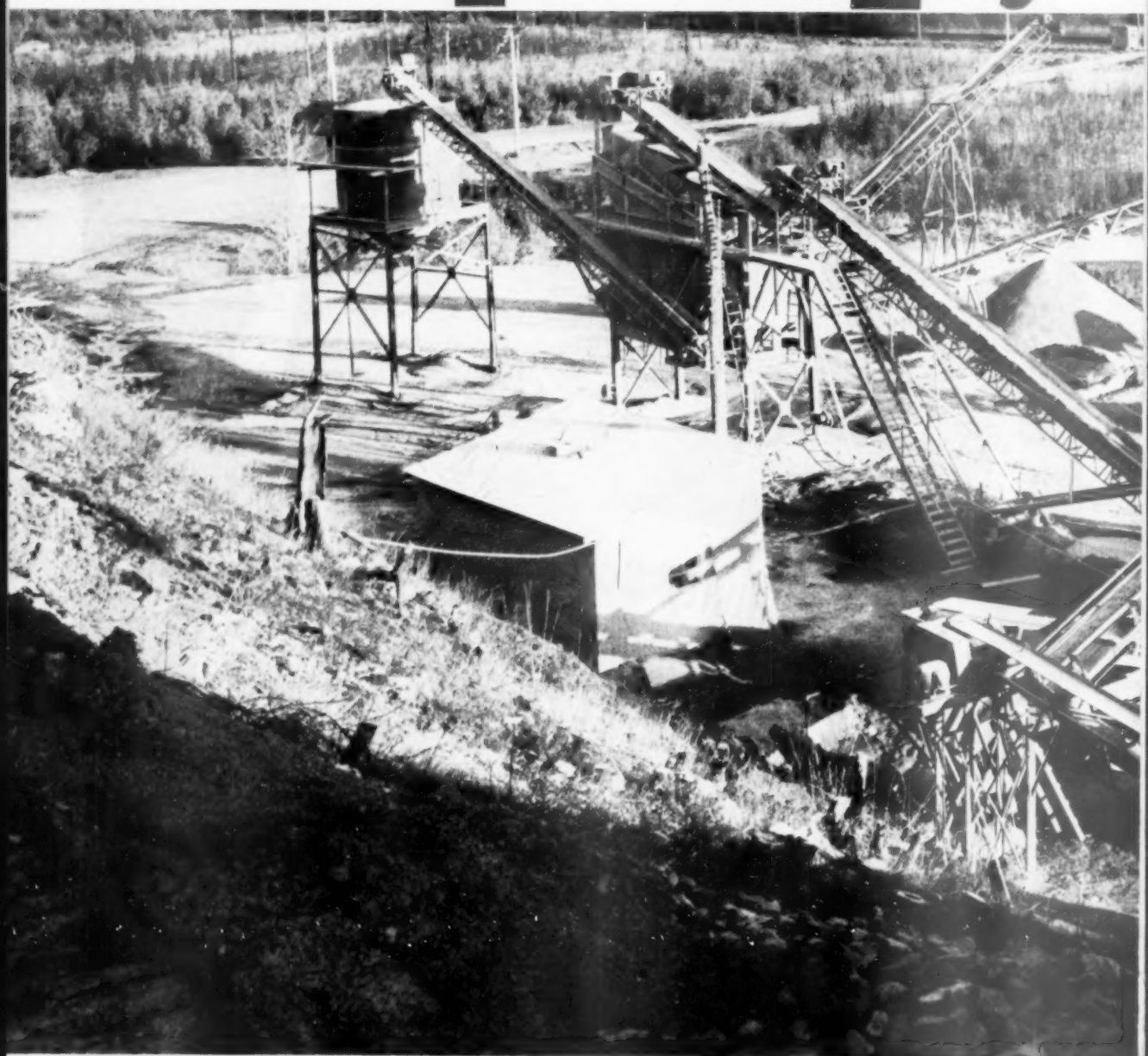
137

- **SALES REPRESENTATIVES IN ALL PARTS OF THE U.S.A.**
- **FOR CANADA:** Canadian Bridge Engineering Co., Ltd., Walkerville, Ontario
- **FOR EXPORT:** Brown & Sites, 50 Church Street, New York 7, N. Y.

Simplicity
TRADE MARK REGISTERED
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When too much oversize became a problem . . .

that Pioneer Edge

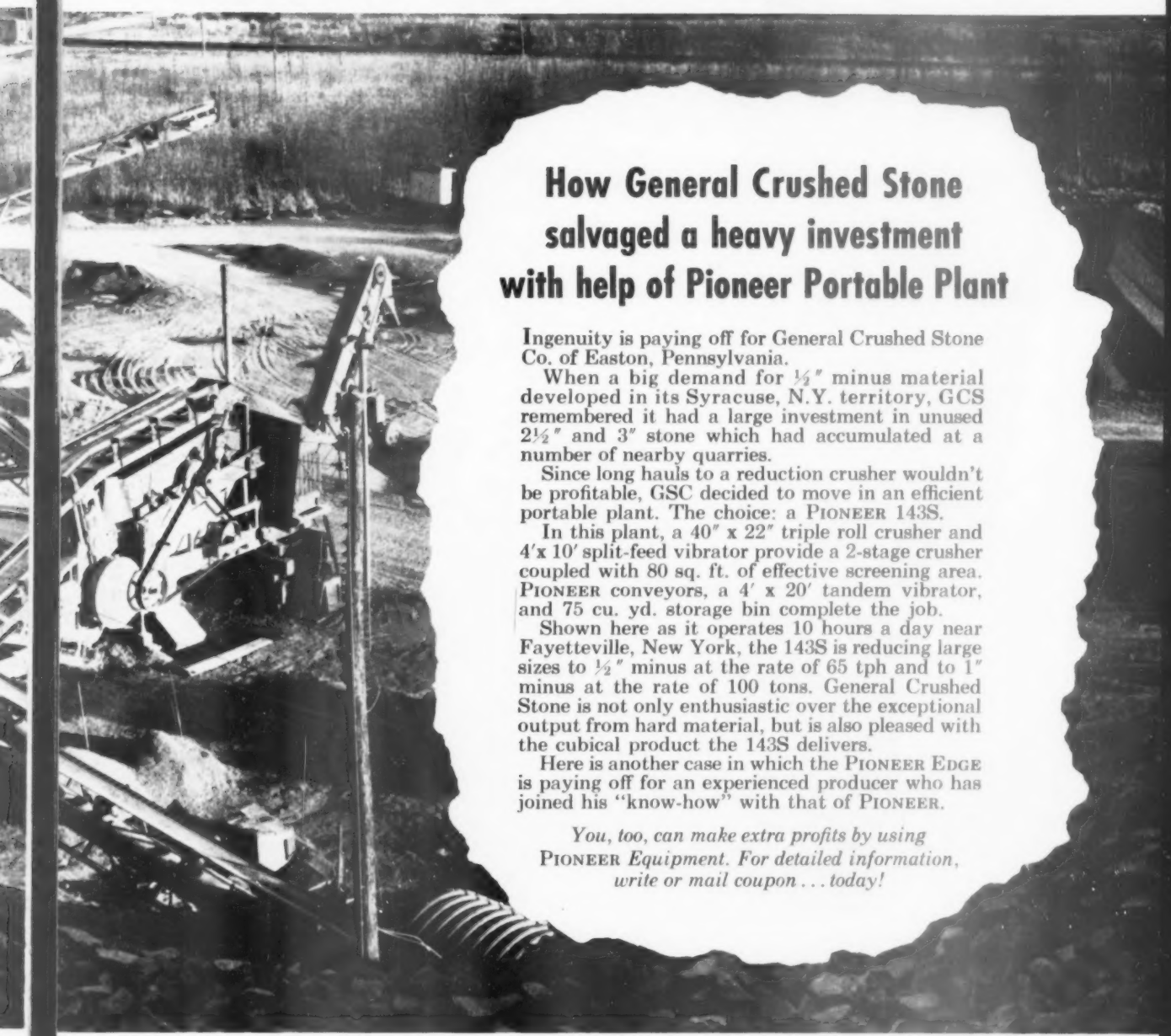


BUY BOTH!
HIGHER OUTPUT
LOWER UPKEEP

Pioneer

Continuflo EQUIPMENT

turned it into profit



How General Crushed Stone salvaged a heavy investment with help of Pioneer Portable Plant

Ingenuity is paying off for General Crushed Stone Co. of Easton, Pennsylvania.

When a big demand for ½" minus material developed in its Syracuse, N.Y. territory, GCS remembered it had a large investment in unused 2½" and 3" stone which had accumulated at a number of nearby quarries.

Since long hauls to a reduction crusher wouldn't be profitable, GSC decided to move in an efficient portable plant. The choice: a PIONEER 143S.

In this plant, a 40" x 22" triple roll crusher and 4'x 10' split-feed vibrator provide a 2-stage crusher coupled with 80 sq. ft. of effective screening area. PIONEER conveyors, a 4' x 20' tandem vibrator, and 75 cu. yd. storage bin complete the job.

Shown here as it operates 10 hours a day near Fayetteville, New York, the 143S is reducing large sizes to ½" minus at the rate of 65 tph and to 1" minus at the rate of 100 tons. General Crushed Stone is not only enthusiastic over the exceptional output from hard material, but is also pleased with the cubical product the 143S delivers.

Here is another case in which the PIONEER EDGE is paying off for an experienced producer who has joined his "know-how" with that of PIONEER.

You, too, can make extra profits by using PIONEER *Equipment. For detailed information, write or mail coupon . . . today!*

Have YOU a Crushing or Screening Problem?

An able and experienced engineering staff is at your service. PIONEER specialists with many years' experience will be glad to discuss your difficulties and help you work out a solution. Write to PIONEER today. *You'll be under no obligation.*

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• Please send me information on the equipment checked.

☐ JAW CRUSHERS	☐ GRAVEL PLANTS	☐ APRON FEEDERS
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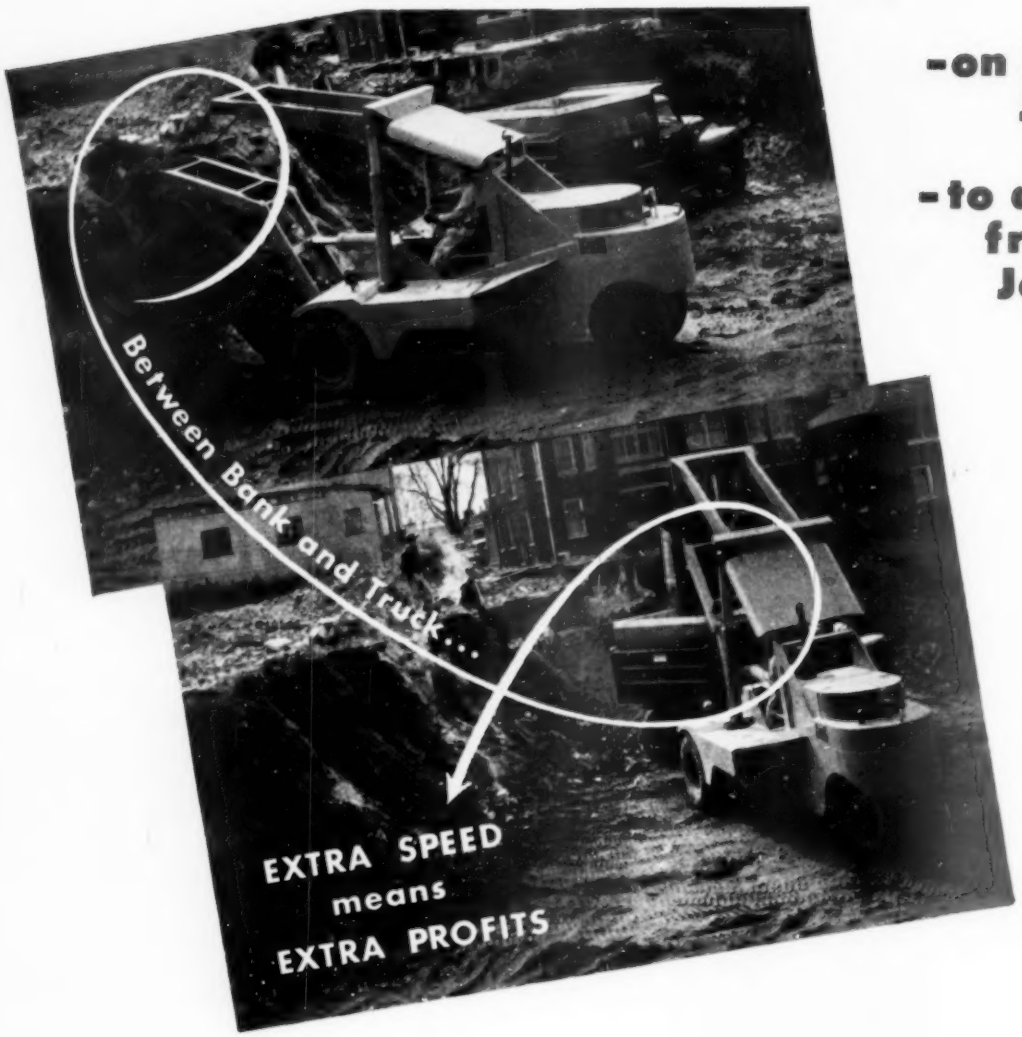
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This Dempster-Diggster Hydraulic Shovel gives you TRUCK-SPEED MOBILITY



-on the Job

-to and from Jobs

These fast moving advantages are obvious and mean the Dempster-Diggster will make more money for you.

In the first place, no hauling equipment is needed . . . no loading and unloading time or man-hours are lost in getting the Dempster-Diggster to and from jobs. In the second place, with truck-speed mobility on the job, this power-packed 100% Hydraulic Shovel gets the job done faster! Here's a shovel that won't skim the bank or bottom—but gets a full bucket with every stroke. It's the only small shovel that offers you all the important features of big shovels . . . Simultaneous and Independent Crowd and Hoist . . . Hydraulic Crowding . . . Hydraulic Hoisting . . . Variable Crowd Action at any Dipper Position in addition to Changeable Buckets for digging or loading.

Write for complete facts on this revolutionary, power-packed hydraulic shovel. A product of Dempster Brothers, Inc.

DEMPSTER BROTHERS, 3103 N. Knox, Knoxville 17, Tennessee



WOULD YOU CLEAN ONLY PART OF YOUR FACE?

No, of course, you wouldn't! Then why clean only *part* of the oil in your engine? Why be satisfied with anything less than the best protection you can give your engine's moving parts? Keep *all* your oil clean, and all the moving parts of your engine protected, with warranted Winslow Full-Flow Filters!



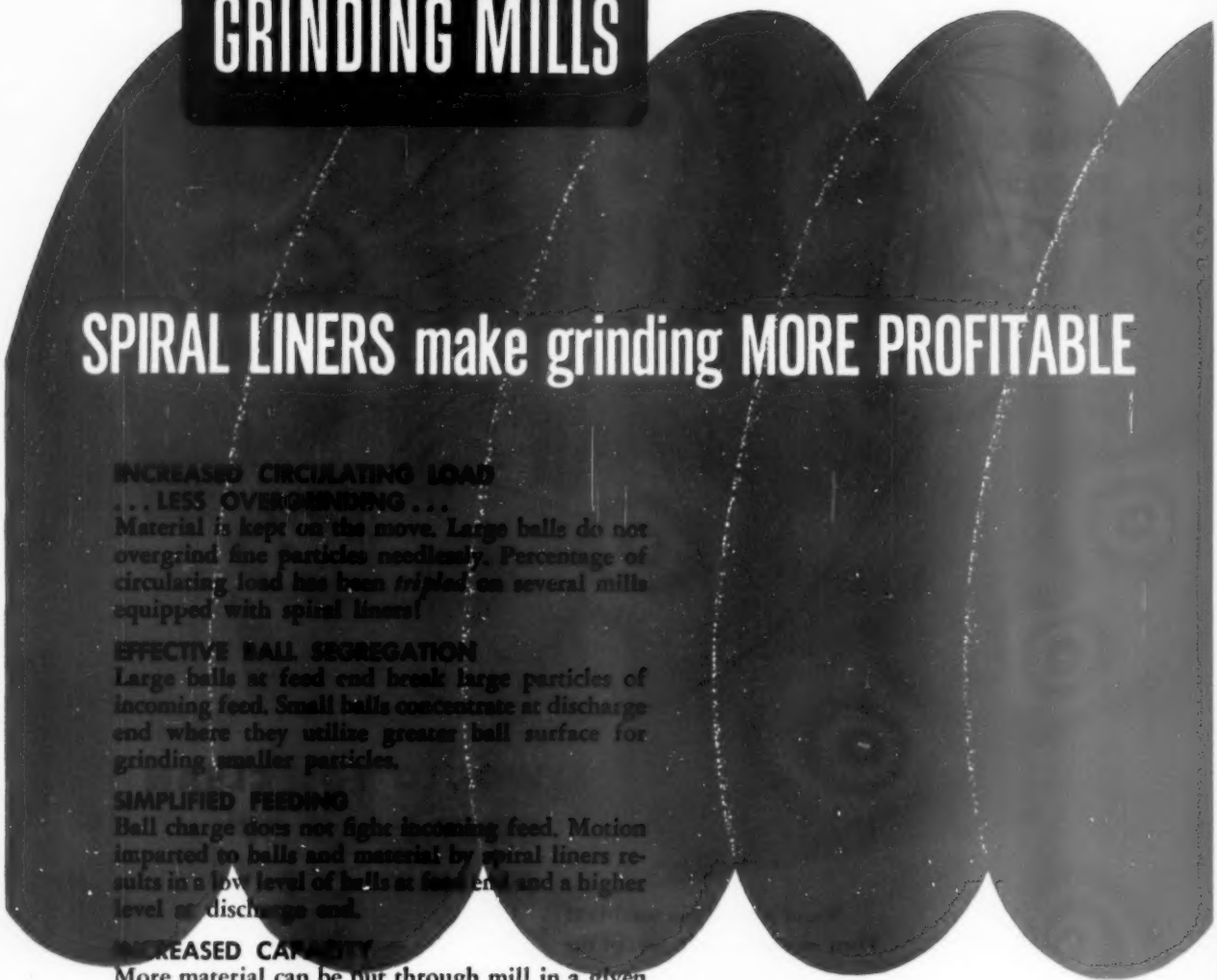
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ALLIS-CHALMERS

GRINDING MILLS



SPIRAL LINERS make grinding MORE PROFITABLE

INCREASED CIRCULATING LOAD
. . . LESS OVERGRINDING . . .
Material is kept on the move. Large balls do not overgrind fine particles needlessly. Percentage of circulating load has been *tripled* on several mills equipped with spiral liners!

EFFECTIVE BALL SEGREGATION
Large balls at feed end break large particles of incoming feed. Small balls concentrate at discharge end where they utilize greater ball surface for grinding smaller particles.

SIMPLIFIED FEEDING
Ball charge does not fight incoming feed. Motion imparted to balls and material by spiral liners results in a low level of balls at feed end and a higher level at discharge end.

INCREASED CAPACITY
More material can be put through mill in a given time. Retention time of material in the mill is reduced. Power cost is less — no power is wasted on overgrinding . . . ball segregation increases efficiency.

For application of spiral liners to your grinding mill, call the Allis-Chalmers representative in your area, or write Allis-Chalmers, Milwaukee 1, Wis.

A-4155

ALLIS-

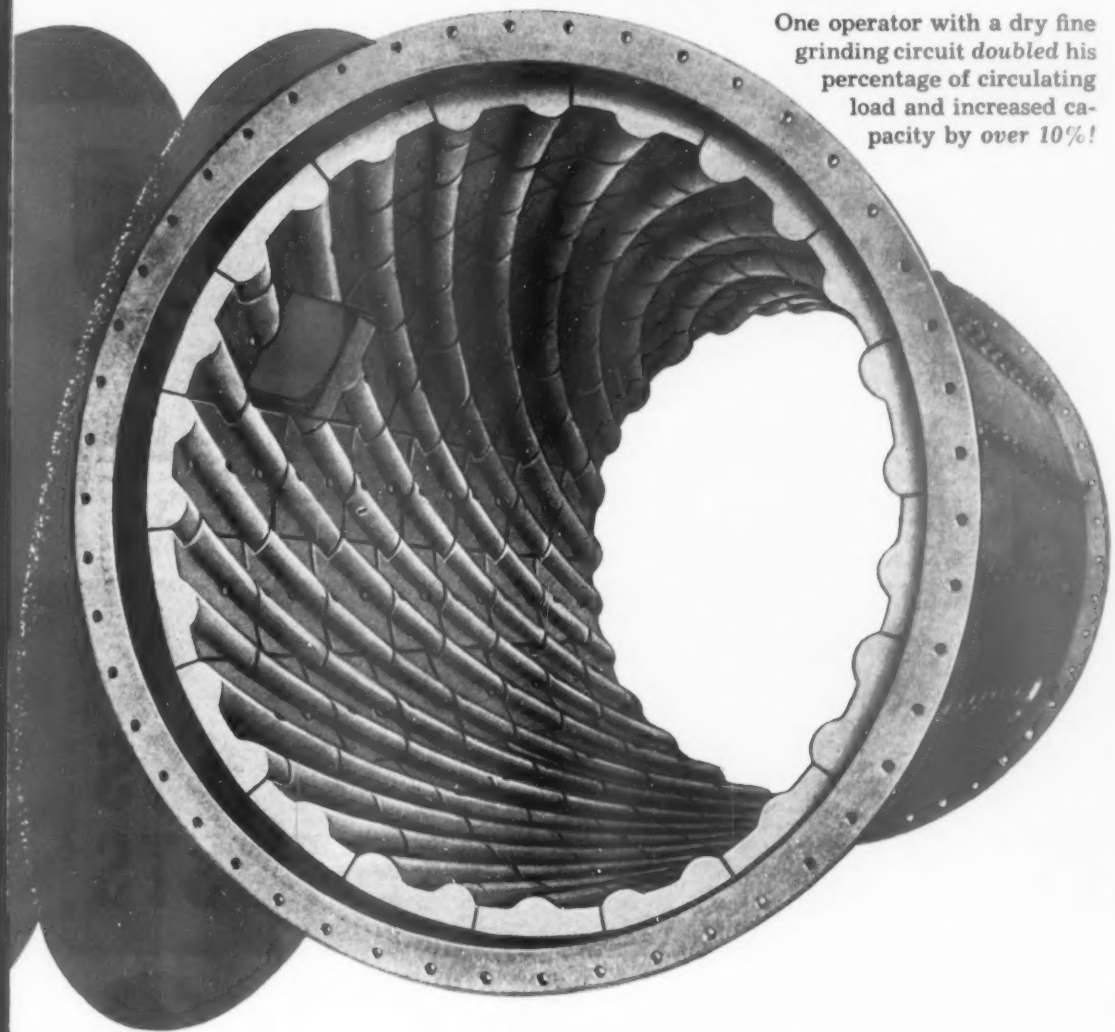
MILWAUKEE 1,

HERE ARE USER EXPERIENCES . . .

One operator with mills in a coarse wet grinding circuit *tripled* his percentage of circulating load with spiral liners.

Another wet grinding mill operator *tripled* circulating load and increased capacity by nearly 10%! Plans at this plant call for spiral liners for all ball mills.

One operator with a dry fine grinding circuit *doubled* his percentage of circulating load and increased capacity by *over 10%!*



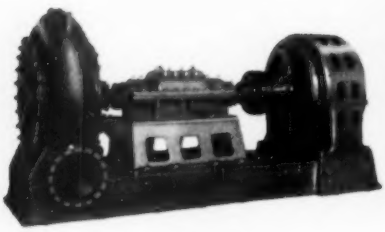


CHALMERS

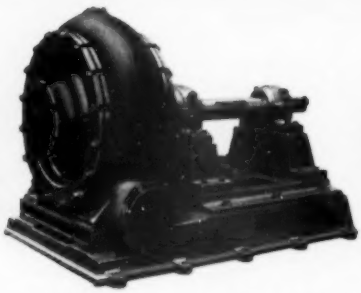
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A-C ALLIS-CHALMERS

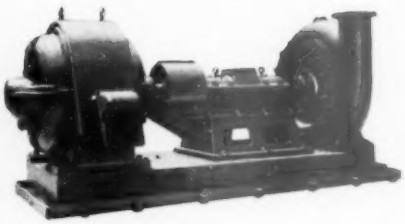
AMSCO PUMPS GIVE LOW-COST HANDLING OF MATERIALS



16-INCH, TYPE XH. Directly connected design; right hand, bottom discharge; water-cooled marine-type combination radial thrust bearing; ring oiling; sleeve-type outboard bearing. Can be fitted with "standard" or "counterflow" water ends.



6-INCH, TYPE SB-CF, FORM 24. Roller bearing; stub base or belt driven; right hand bottom discharge.



10-INCH, TYPE M. Left hand, top discharge. Built in 6-, 8-, and 10-inch sizes. Can be fitted with "standard" or "counterflow" water ends.

AND AMSCO PUMP PARTS AND FITTINGS SAVE IN MAINTENANCE COSTS



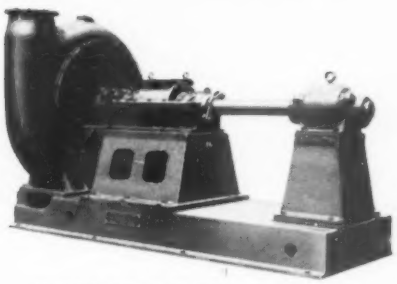
Hose nipple | 90° Elbow | Bulkhead fitting | 45° long radius elbow | Straight | Elbow

AMERICAN Brake Shoe COMPANY

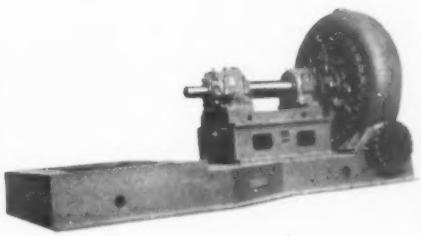
AMERICAN

Made of tough, long-lasting Manganese Steel, Amsco Dredge and Materials Handling Pumps are engineered for efficient operation

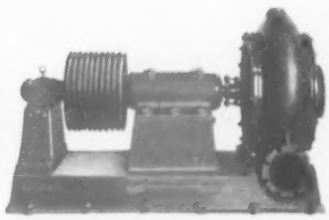
The Amsco Pumps pictured here represent our six basic models; actually there are 40 different models. The differences in each are in rated capacity, weight and construction of the bearings, and proportionate shaft sizes. Such modifications are made for economy in line with the services intended. With all wearing parts made of Amsco Manganese Steel, you get the economy of a work-hardening metal that resists impact and abrasion. This is why it is called "the toughest steel known"...and why Amsco Pumps have given as long as 30 years service. And why Amsco is a byword in the dredging industry.



12-INCH, TYPE H-CF, FORM 40. Right hand, top vertical discharge; belt driven. Combination two directional-type ball thrust bearing and sleeve-type radial bearings.



20-INCH, TYPE XHRB-CF. Left hand, bottom discharge. Antifriction thrust and radial bearings.



8-INCH, TYPE C, FORM 30. Belt driven, standard fitted pump. Left hand bottom discharge; combination ball thrust and ring oiling sleeve main bearings. Can be fitted with "standard" or "counterflow" water ends.

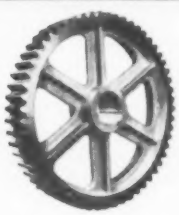
Amsco complementary pumping equipment and pump parts are also made of Manganese Steel for economical service

Amsco pipeline fittings are built to withstand the shocks of large stones and the abrasion of sand-laden water. When these Amsco fittings are finally worn to paper thinness, they never burst or shatter. Instead, "slow leaks" develop which act as a safety signal and give you warning that replacement is necessary.

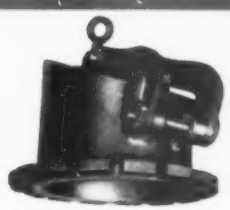
Amsco Sheaves work-harden with use and do not develop cuts or corrugations to wear out cables. Housing breakage is virtually eliminated with Manganese Steel. Nothing can equal the ability of Amsco Manganese Steel Gears to withstand impact and abrasion. And if lubrication is a problem, the self-polishing quality of Manganese Steel eliminates it. These are the features that enable Manganese Steel to pay for itself in economical service.



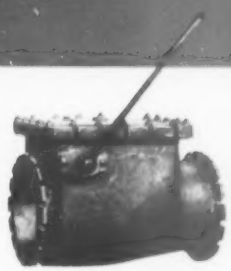
Sheave for 7-cubic-foot clamshell bucket. 4 ft. 4½ in. outside diameter; weighing 1330 lbs.



56 t. spur gear, 6 ft. diameter weighing 6500 lbs. for suction dredge.



Open-type flap valve



Enclosed-type flap valve



Handhole fitted straight nipple

MANGANESE STEEL DIVISION

377 East 14th Street • Chicago Heights, Ill.

Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis. In Canada: Joliette Steel Division, Joliette, Que. Amsco Welding Products distributed in Canada by Canadian Liquid Air Co., Ltd.



ELEVATOR "DOWN" TOO MUCH?

Look up your answer here*

Having trouble with bucket elevator chains? Here's a good way to avoid getting caught with your "plants down." Use the right chain for the job. Not just a Rex Chain BUT the right Rex Chain.

It's an important point to consider because chain breakage is seldom the fault of the chain. It could be that it's misapplied . . . not strong enough for the job! Just take a look at the table. You'll see the complete Rex Line at a glance. Find the chain you're now using and see how easily you can move up into a stronger chain . . . one that will give you longer service . . . eliminate excessive, expensive down time.

We suggest, too, that you consult your Rex Field Sales Engineer. You'll find he's able to give you a lot of valuable help in chain selection . . . help that will save you plenty.

CONDENSED CHAIN SPECIFICATIONS

If You Are Using	And Want a Stronger Chain, We Recommend	Use Same Sprkts.	New Sprkts. Req'd.
†823	825		√
131	S131	√	
S131	S825		√
†825	S825	√	
S825	S102½		√
†830	S830	√	
S830	S844		√
A102B	S102B	√	
S102B	S102½		√
110	S110	√	
S110	S844		√
A102½	S102½	√	
S102½	S111		√
A111	S111	√	
S111	S844		√
†844	S844	√	
S844	S856		√
A132	SA150	√	

*Can also be shipped in Rex Z-Metal which is approximately 25% stronger; furnished with heat treated pins.

†Can also be furnished with alloy pins and manganese bushings.

Chain No.	Pitch	Working Load	Ultimate Strength
*†823 Ley Bushed	4.000	3,150	19,000
*131 Combination	3.075	3,200	24,000
S131 Chabelco	3.075	4,450	40,000
*†825 Ley Bushed	4.000	5,000	30,000
S825 Chabelco	4.000	6,000	50,000
*†830 Ley Bushed	6.000	5,000	30,000
S830 Chabelco	6.000	6,000	50,000
*A102B Durobar	4.000	4,000	24,000
S102B Chabelco	4.000	6,300	40,000
*110 Combination	6.000	4,000	24,000
S110 Chabelco	6.000	6,300	40,000
*A102½ Durobar	4.040	5,600	36,000
S102½ Chabelco	4.040	7,800	50,000
*A111 Durobar	4.760	6,000	36,000
S111 Chabelco	4.760	8,400	50,000
*†844 Ley Bushed	6.000	6,650	40,000
S844 Chabelco	6.000	9,200	70,000
*A132 Durobar	6.050	8,400	50,000
SA150 Chabelco	6.050	15,000	100,000
S856 Chabelco	6.000	14,000	100,000



Get the full story on how the complete line of Rex Chains can help you get the most out of your elevating, conveying and power transmission equipment. Write for Bulletin 52-53 today or call your nearest Rex Field Sales Engineer. Chain Belt Company, 4649 W. Greenfield Ave., Milwaukee, Wis.

CHAIN BELT REX COMPANY ®

Chain Belt COMPANY OF MILWAUKEE

Atlanta • Baltimore • Birmingham • Boston • Buffalo • Chicago • Cincinnati • Cleveland • Dallas Denver • Detroit • El Paso • Houston • Indianapolis • Jacksonville • Kansas City • Los Angeles • Louisville Midland, Tex. • Milwaukee • Minneapolis • New York • Philadelphia • Pittsburgh • Portland, Ore. West Springfield, Mass. • St. Louis • Salt Lake City • San Francisco • Seattle • Tulsa • Worcester

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EXPORT OFFICES: 4800 W. Mitchell St., Milwaukee 1, and 19 Rector St., New York City.

superhighways . . .

built with

TELSMITH

aggregate plants

America is growing a new set of arteries—toll expressways to form a network of superhighways throughout the nation. The famous Pennsylvania Turnpike System and the New Jersey Turnpike were built with the help of 15 Telsmith designed and equipped aggregate plants. Several Telsmith aggregate plants are now being erected to help build the new Ohio Turnpike. When other expressways are built, Telsmith aggregate plants will be on the job. Send for Bulletin 266.





H. B. Mellott
McConnellsburg, Pa.



Pennsylvania Turnpike System, Bedford County
Penna. Turnpike Commission photo

SMITH ENGINEERING WORKS, 508 E. CAPITOL DRIVE, MILWAUKEE 12, WISCONSIN

Cable Address: Sedgworks, Milwaukee

11 East 42nd St., New York 17, N. Y. · 211 W. Wacker Drive, Chicago 6, Ill. · 713 Commercial Trust Bldg., Philadelphia 2, Pa. · 238 Main Street, Cambridge 42, Mass. · Bowser Equipment Co., Milwaukee 3, Wis. · The McKiernan Co., 3520 Lakeside Ave., Cleveland 14, Ohio

Marcus Equipment Co., Bethesda, Md. • Rich Equipment Co., Cincinnati 14, & Portsmouth, Ohio—Charleston 25, & Clarksburg, W. Va.—Roanoke 7, & Richmond 19, Va.
Robert H. Bailey, 616 W. 5th St., Los Angeles 13, Calif. • Mines Eng. & Equip. Co., San Francisco 4, Calif. • Clyde Equipment Co., Portland 5, Ore., & Seattle 4, Wash.

Here's the Machine for L

Be fair with yourself. Does your present loading method really give you the lowest cost for loading trucks?

Does it operate continuously, or does it depend on the zeal and skill of the operator?

Does it tie up your trucks unnecessarily during the loading operation? Or does it release them as rapidly as possible?

Remember your trucks are paying off only when they are hauling.

They don't pay you one dime while they are waiting to be loaded. In fact every idle second costs you money.

The Barber-Greene Model 543 Bucket Loader was designed to save loading time, truck time, and job time.



The Barber-Greene Bucket Loader is easily converted to a Coal or Snow Loader. Quickly maneuvers in tight quarters. Loads from the side or over the top of the truck cab.



If poor footing complicates your loading problem, the B-G Model 52A is the answer. Its crawler-mounted traction enables it to load from stock pile, windrow or bank with equal ease.

see your **B-G distributor** ...or write

...W COST LOADING

Here is a picture of a man making money. He has eliminated unnecessary loading costs and truck delays. For complete information on the Barber-Greene Loader, contact your B-G distributor or write Barber-Greene Company, Aurora, Illinois.





Handling costs are a part of your material costs. To keep your material cost down, use the proven, most economical way of loading trucks. Only a B-G Bucket Loader has so many outstanding exclusive features.

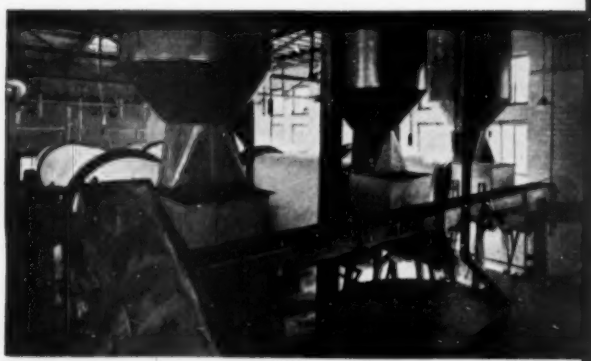
The hydraulically-controlled boom-conveyor permits dual spotting. One truck backs under while the other is being loaded. There is virtually no lost time between trucks.

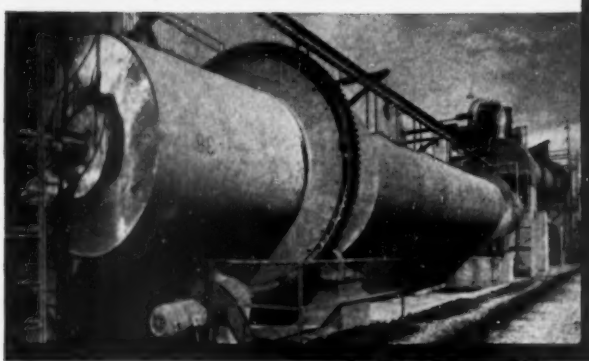
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Aurora, Illinois, U. S. A.

more than 50 years of experience in designing and building dryers for industry...







Louisville dryers

used throughout the world for great efficiency with low maintenance

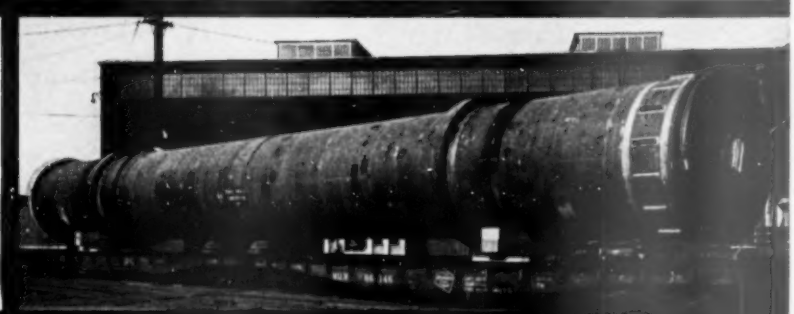
LOUISVILLE DRYING MACHINERY UNIT

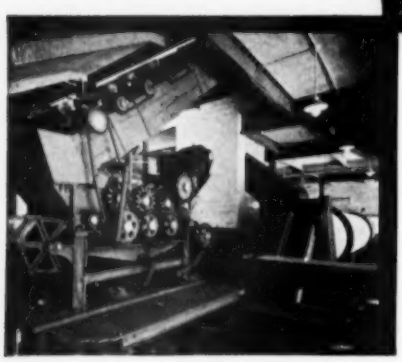
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OFFICES IN ALL PRINCIPAL CITIES

PROCESS EQUIPMENT DIVISION
GENERAL AMERICAN
TRADE MARK

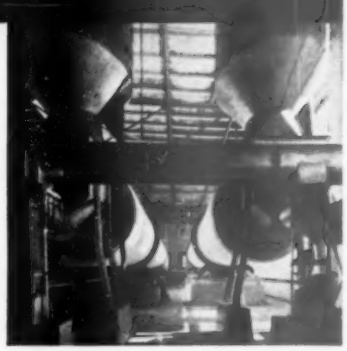




KNOW THE RESULTS BEFORE YOU BUY

Louisville engineers will test your dryer needs in our laboratory. When required, a pilot model will be checked in your plant before full-size dryers are built.

Louisville's creative engineering pre-determines results for you!



Cut your maintenance costs on every rustable metal surface indoors and out with this practical, sensible coating!

STOP RUST! with RUST-OLEUM

Day in and day out, your equipment and metal structures face the *toughest rust-producing conditions* — dust, fumes, rain, moisture, heat and general weathering! To *stop rust* and protect your metal surfaces you need RUST-OLEUM!

RUST-OLEUM may be applied directly over surfaces *already rusted* without removing all the rust. Just wirebrush and scrape with sharp scrapers to remove rust scale and loose particles . . . then apply by brush, dip, or spray. Costly sandblasting and chemical pre-cleaning are not usually required. This means that one man often does the work of two with RUST-OLEUM! Practical, too . . . because RUST-OLEUM *beautifies as it protects* in all colors, aluminum and white.

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May be applied directly over rusted surfaces without removing all the rust!
Available in All Colors, Aluminum and White



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A SOLID BASIS for Sustained High Output

Bucyrus-Erie Individual Design Matches Strength to Capacity

Plenty of strength, stability, and power for sustained high output is an important result of Individual Design. Every model in the Bucyrus-Erie line is designed and built from the ground up for its particular work range. That's why each model does such an outstanding output job in its class.

Look at the 38-B pictured here. It's a 1½-cubic yard shovel all the way through. Front end, main machinery, power unit, and mounting are all perfectly matched to dipper capacity. That's why the 38-B handles its big loads with outstanding efficiency no matter what the material — rock, shale, dirt, gravel, or sand.

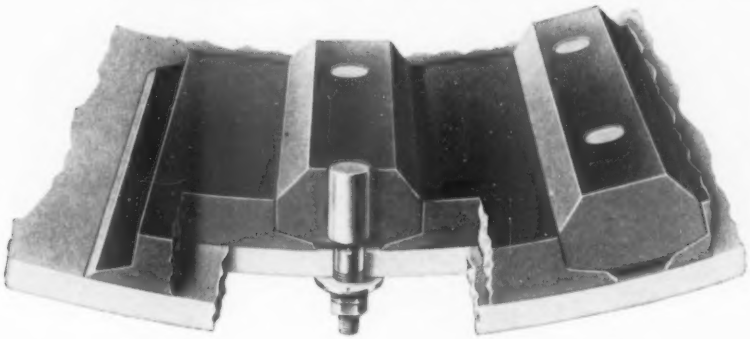
If your quarry or pit calls for shovels, draglines or clamshell-cranes with gasoline, diesel or single-motor electric power in the ⅜- to 4-cubic yard size range, see your Bucyrus-Erie distributor for complete details on how you can step up output with a Bucyrus-Erie — the line that features Individual Design for each model. For information on larger quarry and mine excavators, write direct. 40E53

BUCYRUS ERIE

South Milwaukee, Wisconsin

You can cut costs

in your grinding operation with U·S·S Lorain Rolled Plate Linings



- Linings are in easy-to-handle sections, accurate sizes to permit quicker installation
- Plates can be heat-treated to compensate for localized wear
- Correct sizes make tighter joints . . . eliminate shell wash
- Lift bars are designed for correct cascade action . . . height of lift varied according to conditions
- Bolt supports located near the bottom of the bar . . . last for life of the lining

● You can do more and better grinding, for less money, with U·S·S Lorain Rolled Plate Linings. The output of your mill increases when the usable diameter increases, and this is just what happens when rugged Lorain *rolled steel* plates are used instead of ordinary castings. Lorain Liners can be much thinner due to their superior strength. Their lighter weight simplifies handling.

You save money with U·S·S Lorain Rolled Plate Linings because they are readily installed and require less maintenance. The plates are accurately made and are in easy-to-handle sections for ready use. Severe localized wear at feed or discharge end of the mill can be balanced by heat-treating. Lorain Liners are so durable that they remain serviceable until they're almost paper thin. You benefit from the use of the entire plate . . . there is less waste, longer wear. Mill down-time will be reduced and so will your upkeep costs.

The accurate size of U·S·S Lorain Rolled Plate Linings assures tight fit between the ends of the plates and between plates and lift bars, eliminating shell wash.

U·S·S Lorain Rolled Plate Linings are available—in the diameter, length and thickness best suited to your operating conditions—through leading mill manufacturers whose names will be furnished upon request.



U·S·S GRINDING BALLS are carefully made of special composition steel to take long, rough wear evenly. Samples from each production lot are thoroughly tested to make sure of surface hardness and maximum hardness penetration. They come in eleven sizes from ¾" to 5". For further information just return the coupon below.

United States Steel Corporation
Room 2817-O, 525 William Penn Place
Pittsburgh 30, Pa.

Without obligation on my part, please send me your FREE booklet on U·S·S Grinding Balls.

Name .....

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TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

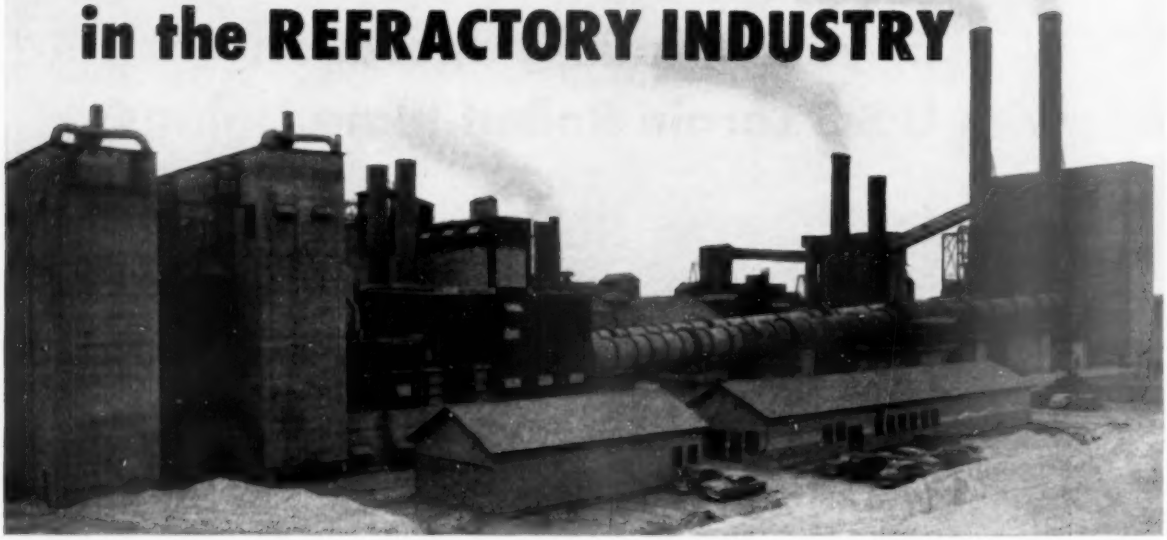
U·S·S LORAIN ROLLED PLATE LININGS AND U·S·S GRINDING BALLS

USS

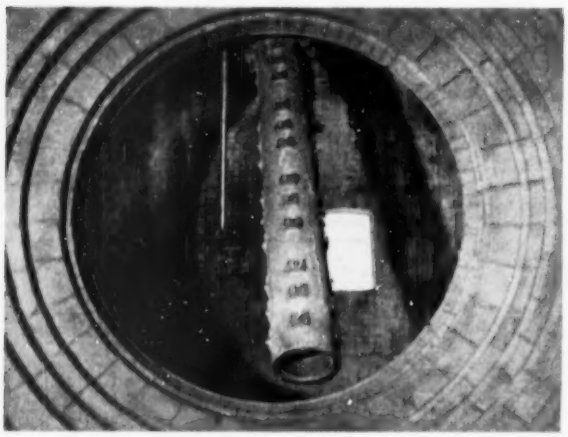
3-2023

UNITED STATES STEEL

THERMALLOY*at work...
in the REFRACTORY INDUSTRY



This is the new home of the largest rotary kilns in the refractory industry . . . recently completed by Basic Refractories, Inc., in Maple Grove, Ohio. Measuring 11'3" in diameter by 390' long, each kiln daily processes approximately 2000 tons of granular dolomitic refractories for open-hearth and electric, steel-furnace linings. With continuous operation in this plant, equipment must give top performance, with minimum down time. Shown below are two important parts in Basic's production equipment . . . both made from high-heat and abrasion-resistant Thermalloy. Their design was achieved by co-operation between Electro-Alloys' and Basic's engineers. The same engineering help is available to you at Electro-Alloys.



Thermalloy Kiln Feed Pipe . . . The outside shell of the pipe must resist warping at temperatures up to 1700°F. in the dust collector chamber. The interior lining must resist the abrasive action of dolomite tumbling continually into the kiln. Both jobs are successfully done by selected grades of Thermalloy.



Thermalloy Damper . . . The sectional design of this high heat-resistant Thermalloy damper offers several cost-saving advantages in comparison to heavier refractory dampers formerly used: installation and handling are easier; damper sections can be replaced and repaired faster; draft control can be maintained more effectively.

Put Heat-Resistant Thermalloy to Work in Your Plant . . .
call or write

*Reg. U. S. Pat. Off.

AMERICAN Brake Shoe COMPANY

ELECTRO-ALLOYS DIVISION
ELYRIA, OHIO

NEW, Power-Packed AND READY TO GO!



NEW U-1091 natural gas power unit develops 187 net h.p. at 1400 rated r.p.m.; 200 net h.p. at 1600 max. r.p.m.; maximum torque, 820 lbs. ft. @ 800 r.p.m.



NEW U-450—102 net horsepower at 1800 rated r.p.m.; 110 @ 2200 r.p.m.; maximum torque, 324 lbs. ft. @ 1200 r.p.m.



NEW U-406—91 net horsepower at 1800 rated r.p.m.; 98 @ 2200 r.p.m.; maximum torque, 279 lbs. ft. @ 1200 r.p.m.



NEW U-372—83 net horsepower at 1800 rated r.p.m.; 91.5 @ 2200 r.p.m.; maximum torque, 263 lbs. ft. @ 1200 r.p.m.



NEW U-269—62 net horsepower at 1800 rated r.p.m.; 72 @ 2400 r.p.m.; maximum torque, 191 lbs. ft. @ 1200 r.p.m.



NEW U-240—55 net horsepower at 1800 rated r.p.m.; 64 @ 2400 r.p.m.; maximum torque, 168 lbs. ft. @ 1200 r.p.m.



NEW U-220—50.5 net horsepower at 1800 rated r.p.m; 62 @ 2400 r.p.m.; maximum torque, 151 lbs. ft. @ 1200 r.p.m.

IH Announces Seven New International Engines

Seven new six-cylinder, carbureted, valve-in-head engines have been added to the International line, which now includes 18 models—diesel, gasoline or gas—ranging from 16.5 to 200 net horsepower.

These new models are the result of more than 45 years of IH engineering and manufacturing experience building a complete line of heavy duty engines for tractors, trucks, construction and oil field equipment and individual power unit applications.

These new units have the durability, flexibility and economy to meet your requirements for lower cost performance. The unmatched network of IH district offices, parts depots, distributors and dealers puts complete service facilities practically at your door.

If you are an individual user of engines, it will pay you to see your nearest International Industrial Distributor or Power Unit Dealer for more complete information. If you are a manufacturer, your nearest IH district office will be glad to help you engineer these engines into the equipment you are building.

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILL.

POWER THAT PAYS — **INTERNATIONAL**

Loaded with Pull...
U. S. RAINBOW®
V-BELTS



Why U. S. Rainbow V-Belts are superior: No. 2 in a series.

Every U. S. Belt has the unique Equa-Tensil Cord Section—the exclusive U. S. Rubber development that insures efficient *pull* and strength under a wide range of operating conditions.

These belts are specially made to outlive ordinary belts and give more efficient service—the cords have had their stretch worked out by mechanical means, but still retain enough elasticity to enable the belt to take very heavy shock loads. A special latex treatment of the cords reduces heat generated by constant flexing and also provides maximum adhesion between the component parts of the belt.

Order from your jobber, or contact any of our 25 District Sales Offices, or write to address below.

A COMPLETE DRIVE SERVICE

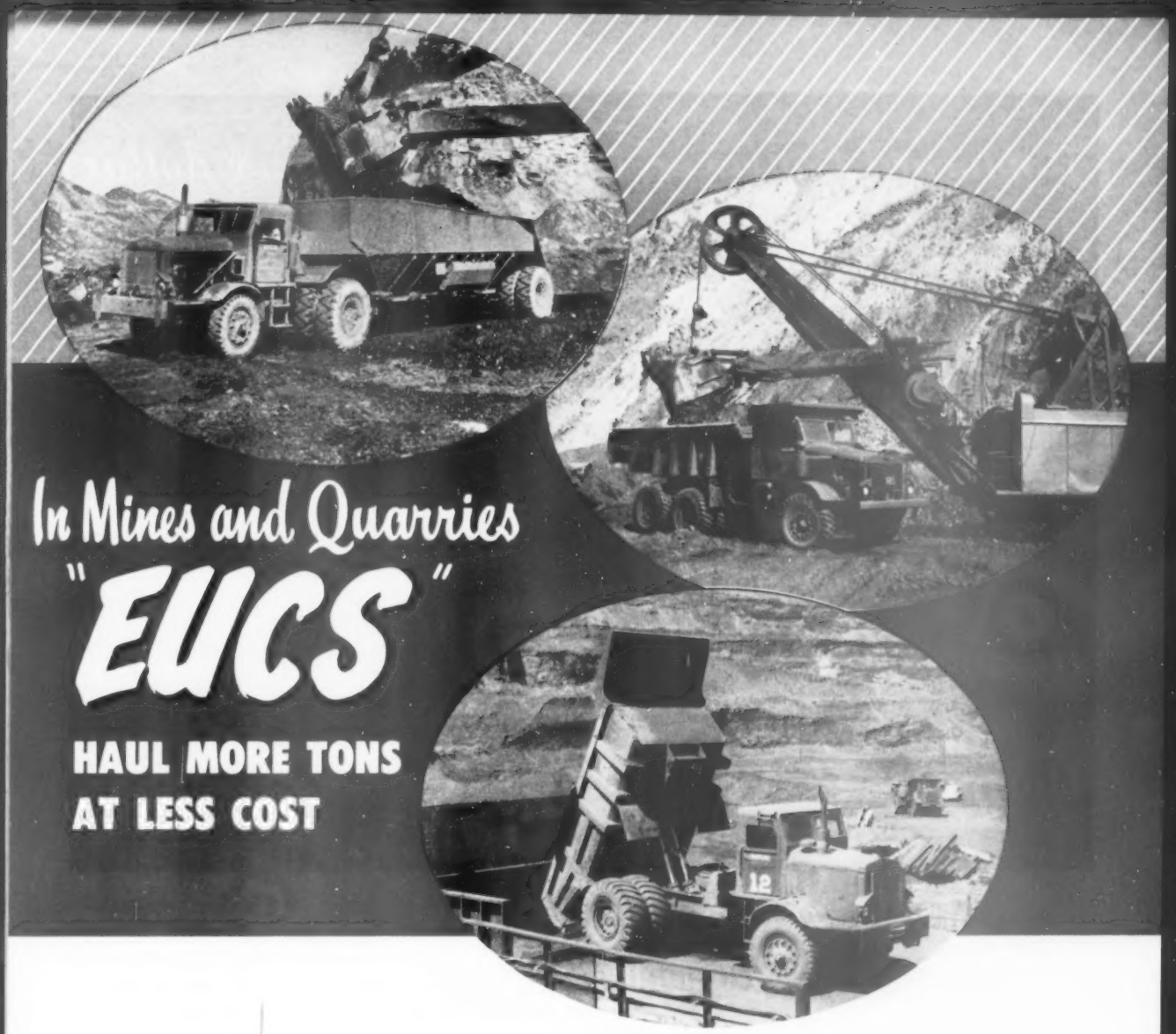
MULTIPLE V-BELTS • F.H.P. V-BELTS • SHEAVES
FLAT BELTS AND BELTING • SPECIAL PURPOSE BELTS

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In Mines and Quarries "EUCS"

HAUL MORE TONS AT LESS COST

Built for tough off-the-highway hauling, Rear-Dump and Bottom-Dump "Eucs" have stepped up production and cut hauling costs on hundreds of open pit mining and quarry operations.

Euclids have proved their efficiency and long life in hauling a wide variety of materials . . . coal, ore, rock, overburden and other heavy excavation. Bottom-Dumps are powered by diesel engines of 190 to 300 h.p. . . . loaded speeds up to 34.4 m.p.h. . . . available in 20 to 40-ton capacities. Rear-Dump "Eucs" have travel speeds up to 36.3 m.p.h. . . . powered by diesel engines of 125 to 400 h.p. . . . range in capacity from 10 to 34 tons.

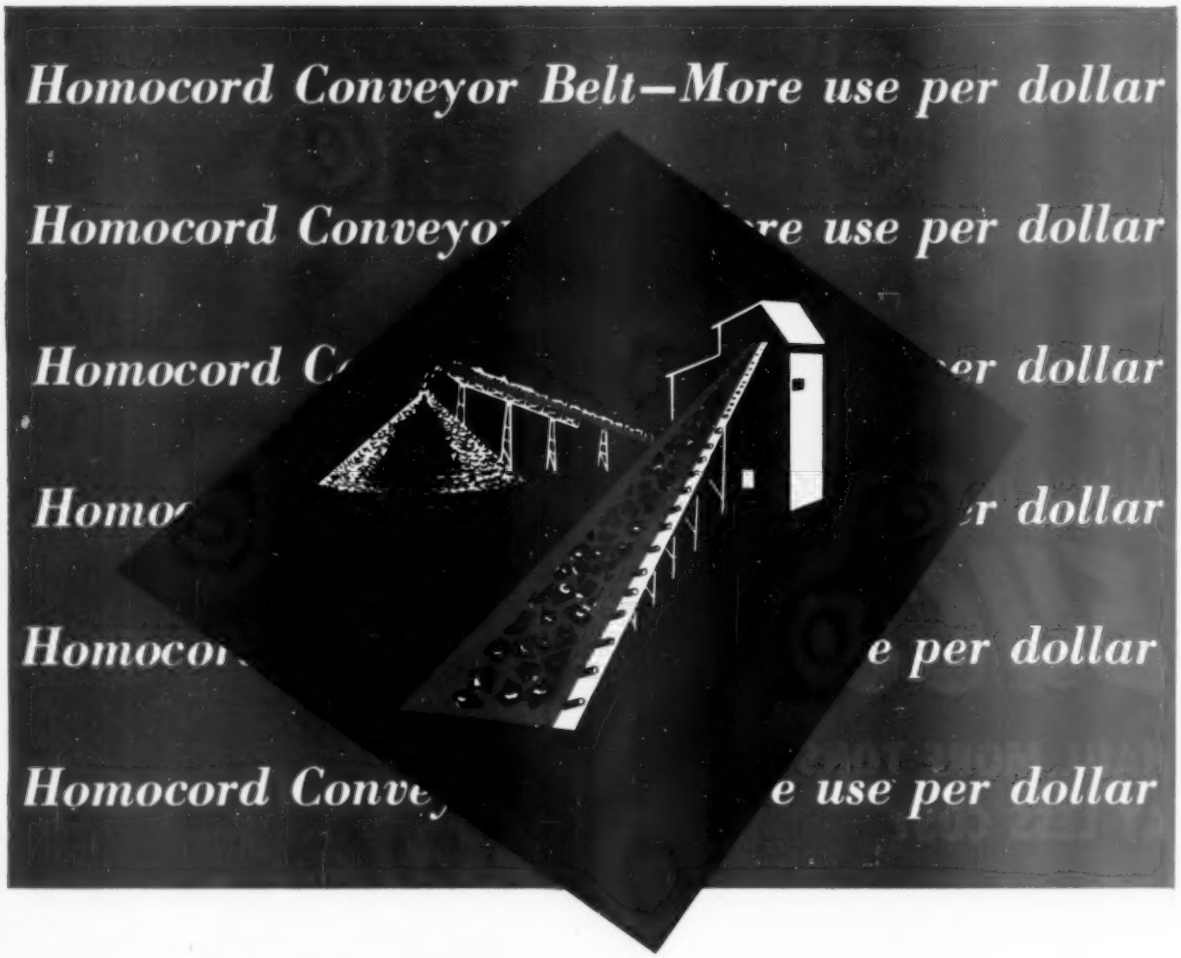
Your Euclid Distributor has performance data on jobs similar to yours. Ask him for a Euclid hauling cost estimate — there's no cost or obligation.

The EUCLID ROAD MACHINERY Co. • CLEVELAND 17, OHIO

EUCLID THE PIONEER

Euclid Equipment

FOR MOVING EARTH, ROCK, COAL AND ORE



MORE SHOCK-LOAD CUSHIONING . . . The extra body-cushion built into Homocord Conveyor Belt dissipates even the shock of sharp impact from large lumps of coal, rock and ore . . . A Homocord Conveyor Belt resists gouging and cutting. It lasts longer . . . and hauls more too—because it troughs naturally and trains easily in the idlers. That's MORE USE PER DOLLAR. Another R/M Conveyor Belt, Ray-Man "F", is designed particularly for underground mining where pulleys are small and great flexibility and tear resistance are needed. Both of these R/M belts give you long life on the job, MORE USE PER DOLLAR. Ask the R/M distributor for Bulletins 6906 and 6915. R/M field engineers back him up to save you money—not only in conveyor belts, but in hose, transmission and V-belts.

R/M

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.



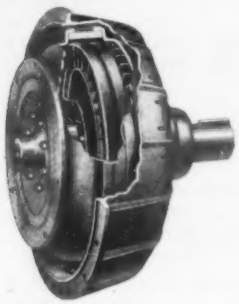
Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings
Asbestos Textiles • Teflon Products • Packings • Sintered Metal Parts • Bowling Balls

(Advertisement)

How Hydraulic Coupling Works in a Power Shovel

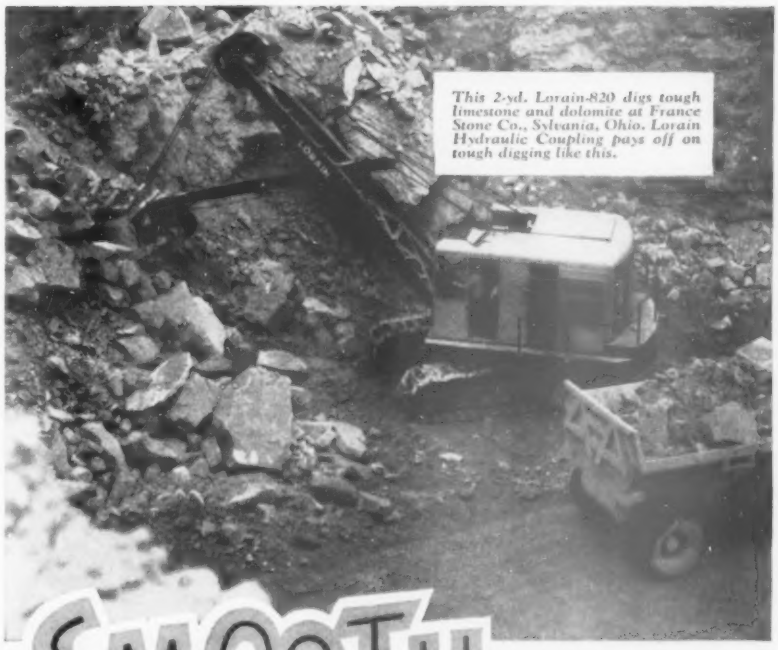
The hydraulic coupling type of power take-off has been proven over the years to add greatly to shovel-crane performance and life. It absorbs the impacts and shocks of hard digging, thereby reducing strain and wear on cables, machinery and engine, and it prevents the engine from stalling under any digging or lifting conditions — which is a time-saving, machine-saving feature. These many advantages are readily acknowledged by most shovel-crane men, but even some of those who like what a hydraulic coupling does for them, find it difficult to understand just how it works.

It is a load limit clutch that efficiently transmits full engine power



under normal conditions but "slips" when a shovel dipper, for example, is "hung up" on an immovable rock. This allows the engine to continue to develop full torque, with no abnormal strain on it, the machinery or cables. There is no shuddering to a standstill with stalled engine and the immeasurable strain this puts on the whole machine, as encountered with a friction type of take-off.

Even with a mechanical, band type of slip clutch, which is meant to provide shock relief, a maximum point of shock must be reached first before it becomes operative and is released. On the other hand, the hydraulic coupling has an infinite number of points of release, so to speak, which come into operation **before** the point of shock or overload is reached and not **after**. There is no surface friction, no mechanical wear, no overheating of parts. While it is mounted directly on the engine drive shaft, its "cushioning" effect would be as great no matter where it was located in the power train. It absorbs shock in both directions from itself thus giving protection from the dipper teeth to the engine. However, placed where it is, it acts on all phases of operation — hoist, swing, travel, crowd and retract.



This 2-yd. Lorain-820 digs tough limestone and dolomite at France Stone Co., Sylvania, Ohio. Lorain Hydraulic Coupling pays off on tough digging like this.

SMOOTH is the word when it's a *LORAIN-820* in rock!

Your eyes and ears can tell you what a beating your shovel takes in rock. It's a tough life — full of sudden shocks and impacts — that only the best design can withstand.

You will see a big difference in Lorain-820 shovel performance . . . the difference made by the use of Lorain's Hydraulic Coupling. This efficient fluid drive *smooths* out the shocks and impacts, *cushions* them before they have a chance to wrack and strain turntable mechanism and cables. Lorain's steady power keeps "hanging on" until the most unyielding rock is in the dipper — the toughest digging cannot stall the engine. Available air controls and air assist of crowd and travel operations make the operator's job smooth and easy. The net result — more rock in the trucks at the end of the day!

See a Lorain-820 in action. Ask your Thew-Lorain Distributor to show you the "smoothest" rock shovel you can buy.

THE THEW SHOVEL CO., Lorain, Ohio

SEE THE THEW LORAIN 820 ASK YOUR DISTRIBUTOR

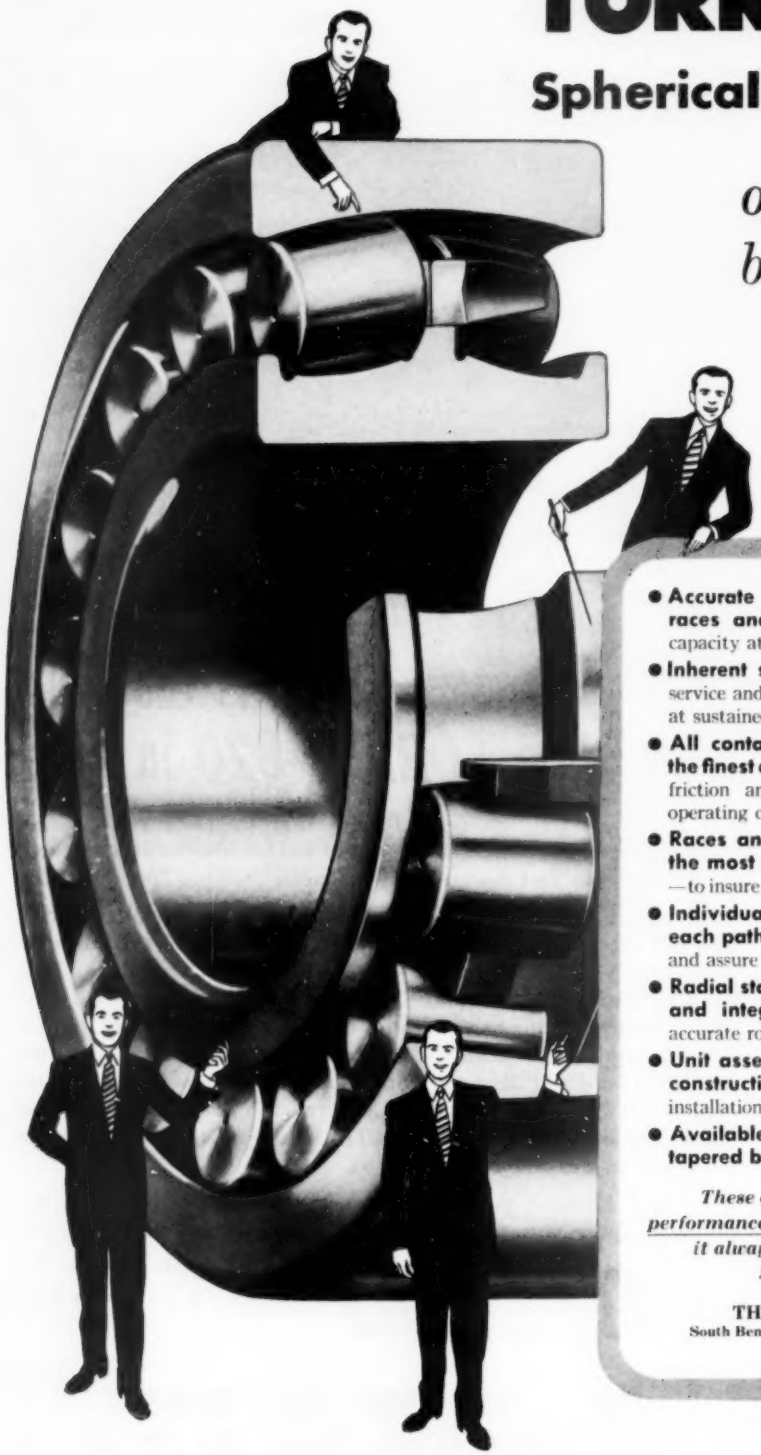
THEW LORAIN

SHOVELS • CRANES • CLAMSHELLS • DRAGLINES • HOES

TORRINGTON

Spherical Roller Bearings

offer you these basic advantages!



- **Accurate geometrical conformity between races and rollers**—for maximum load bearing capacity at all times.
- **Inherent self-aligning feature**—for continuous service and free-rolling even under shock loads and at sustained speeds.
- **All contact surfaces precision ground from the finest of bearing quality steels**—for minimum friction and maximum life under the toughest operating conditions.
- **Races and rollers heat treated according to the most advanced metallurgical procedures**—to insure uniform hardness in all load-bearing parts.
- **Individual one-piece cast-bronze cage for each path of rollers**—to eliminate roller binding and assure freedom of operation.
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- **Unit assembly, with sturdy flange and race construction**—for easy, economical handling during installation.
- **Available from stock with either straight or tapered bore**—for shaft or adapter mounting.

These advantages add up to maximum performance for your bearing dollar. That's why it always pays to specify TORRINGTON Spherical Roller Bearings.

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TORRINGTON SPHERICAL ROLLER **BEARINGS**

Spherical Roller • Tapered Roller • Cylindrical Roller • Needle • Ball • Needle Rollers



Refractory test furnace shown above is the only one of its kind in the industry. Temperatures up to 3180° F. check Permanente Periclase-Chrome brick for deflection, resistance to thermal shock and chemical attack—only three of 86 rigid tests for quality!

86 RIGID TESTS ASSURE LONGER HOT ZONE LIFE

WITH PERMANENTE PERICLASE-CHROME BRICK!

IF YOU are looking for ways to get longer hot zone lining life from your rotary cement kiln, take a look at this fact:

Permanente Periclase-Chrome brick must meet at least 86 tests for quality and performance—far more than required for any other brick available today!

The superior quality of Permanente Periclase-Chrome brick is increasing clinker production in kilns all over the country. One large cement producer reports:

"With the whole length of the burning zone lined with Permanente brick . . . the lining will last 9 to 12 months—as much as 4 times longer than with the other brick used."

If an appraisal of your kiln performance would be helpful, our engineers will be glad to work with you.

SEND FOR BOOKLET giving installation procedures and for descriptive literature. Standard brick shapes available, both burned and chemically bonded. Installation service at no extra cost. Call or write principal sales offices: *Chemical Division*, Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, California; First National Tower, Akron 8, Ohio.

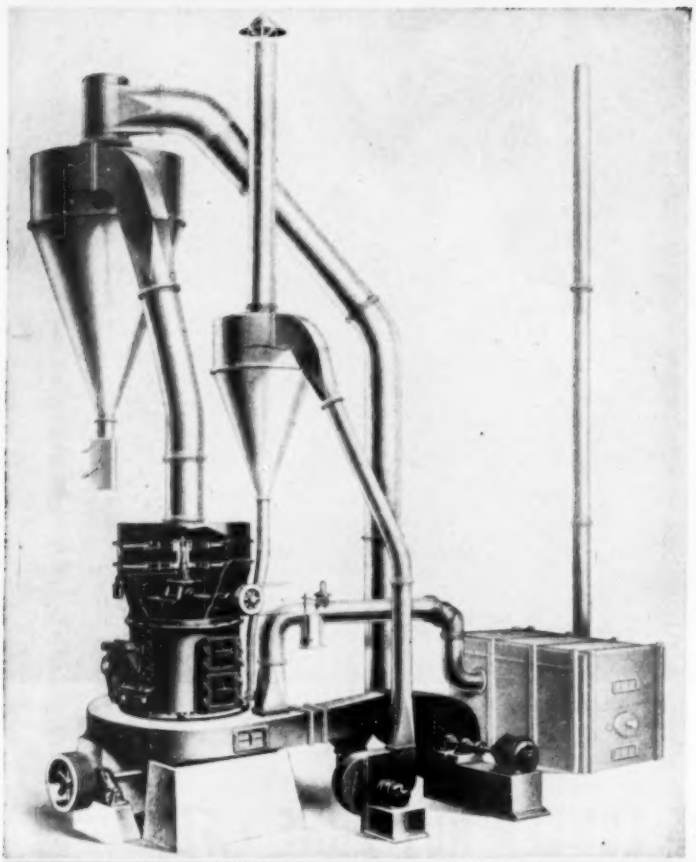
Kaiser Chemicals

Pioneers in Modern Basic Refractories

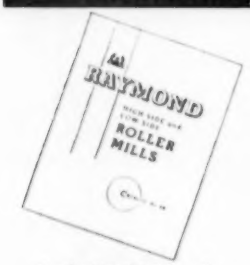
Basic Refractory Bricks and Ramming Materials • Dolomite • Magnesia • Magnesite • Alumina • Periclase

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FOR FINISH-GRINDING MOST NON-METALLICS • FOR DRYING AND GRINDING SIMULTANEOUSLY



DRYING AND GRINDING—ONE OPERATION



For further details, write for Raymond Catalog No. 69

When equipped with Flash Drying accessories, as shown above, the Raymond Roller Mill can handle materials containing as high as 10% to 15% initial surface moisture, as for example in pulverizing limestone.

The material is dried simultaneously while grinding, and the moisture content reduced to less than one per cent, producing a fine, dry, free-flowing product.

RAYMOND Roller Mills are built in such a full range of types and sizes that they cover practically the whole field of application in the finish grinding of non-metallic minerals.

For more than half a century, the leadership of Raymond Roller Mills has been maintained by a consistent record of economical production in all conditions of service.

The wide preference for these machines is based on their ease of control, clean dustless operation, and automatic handling of the material from feed hopper to finish bin without waste of material or loss of time in rehandling.

MAXIMUM MILL OUTPUT

The Raymond Roller Mill is equipped with a pneumatic feed control, which is a "production booster" that keeps the mill operating at peak capacity. It prevents underfeeding and overfeeding. It maintains a maximum "load" on the mill at all times. This is one of the reasons why Raymond Roller Mills deliver such consistent high tonnages at unusually low power costs.

TYPICAL PRODUCTS HANDLED

Raymond Roller Mills are specially adapted for pulverizing and classifying such materials as:—

LIMESTONE • GYPSUM
DOLOMITE • KAOLIN
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COMBUSTION
Raymond
PULVERIZER DIVISION

FIRST FOR EVERY GRINDING NEED

CAPACITIES UP TO 30 TONS OR MORE PER HOUR • FINENESSES UP TO 99.9% PASSING 325 MESH

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These big machines are built for delivering capacities of 15, 20 and 30 tons or more of finished material per hour.

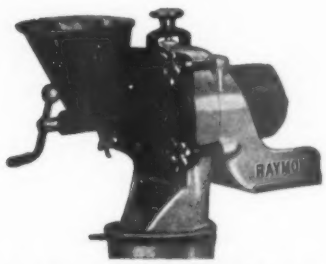
This "mass production" of fine materials is highly economical because it conserves space, centralizes operations, simplifies material handling, and insures uniformity of product.

It also offers important savings in installation, maintenance and supervision costs, as compared to a multiple mill installation of equivalent output.

Super Roller Mills may be equipped with Flash Drying System for removing small percentages of surface moisture, thus eliminating the use of separate equipment for pre-drying.

RAYMOND LABORATORY MILL

In contrast to the larger Raymond mills, the Laboratory Mill provides a small capacity unit for handling a few pounds of material at a time for experimental work or for running test samples for controlling production. It is useful for developing new products, as it delivers the same character of finished material as do the large commercial mills.



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A complete motored unit assembled and mounted ready for operation.



RAYMOND SUPER ROLLER MILL

Equipped with double automatic feeders and whizzer separator with individual variable speed drive.

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Lower price if Crane Carrier Extras such as double out-riggers and fenders not desired. (Price subject to change)

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CRAWLER

5-ton . . . ⅜ cu. yd.



Yours for only $10,330

Complete Crawler Back Hoe with 30" bucket, f.o.b. Factory. (Price Subject to Change)

Now . . . BANTAM Offers Any Type of Mounting You Want

The versatile, job-proved BANTAM which has established enviable records of economy on all kinds of lifting and excavating jobs everywhere is now available with a wide choice of mountings, letting you select the best suited combination to handle your jobs faster and at far less cost.

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But, that's not all! Then, to meet your needs for a top quality, low-priced ⅜-yard crawler shovel-crane, Schield BANTAM now offers the new Model C-35 . . . it's the revolutionary crawler everyone's talking about! And, best of all — no matter which type of mounting your work calls for, the complete BANTAM with any one of 9 fast-change front-end attachments is still the lowest priced, ⅜-yard, 6-ton shovel-crane on the market.

Investigate the BANTAM method . . . find out how a BANTAM lets you bid lower and get more work. Ask for a free demonstration on your job. See your nearest Schield BANTAM Distributor or contact the factory, TODAY!

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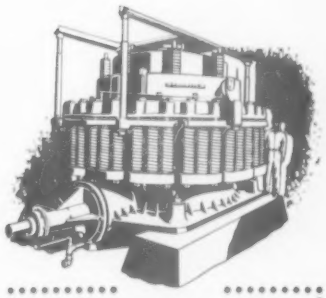
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In the great agricultural lands of America, limestone has long been recognized as an invaluable aid to raising better crops . . . as well as an important mineral supplement in poultry and animal feeding. In the building of the modern cities of today, limestone has paced America's progress by making possible better roads and streets, building stone, cement, steel for building and transportation, glass . . . and hundreds of other materials and products that are woven into the pattern of modern civilization.

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SYMONS Cone Crushers . . . *the machines that revolutionized crushing practice* . . . are built in Standard, Short Head, and Intermediate types, with crushing heads from 22 inches to 7 feet in diameter—in capacities from 6 to 900 tons per hour.

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SYMONS GYRATORY CRUSHERS



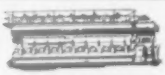
GRINDING MILLS



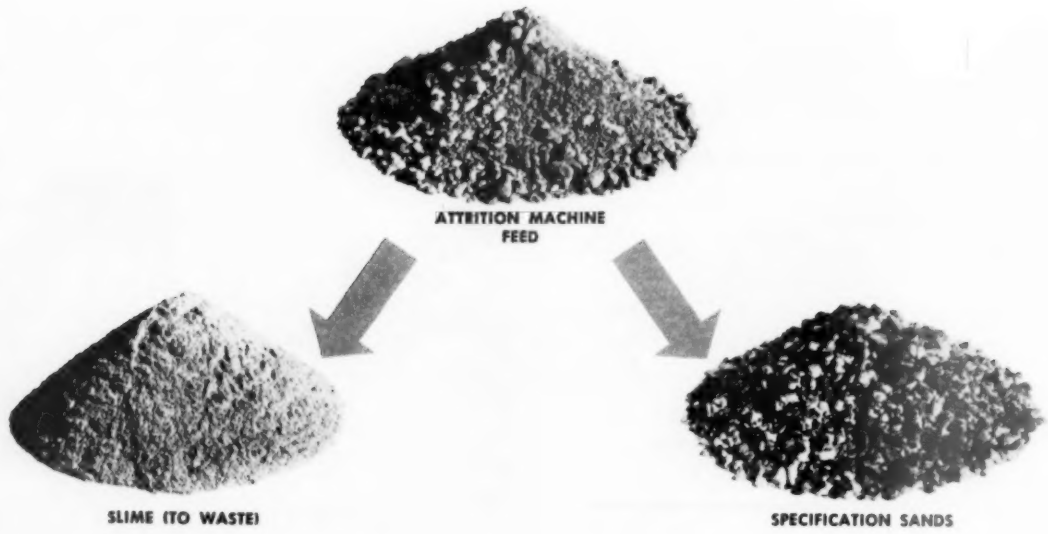
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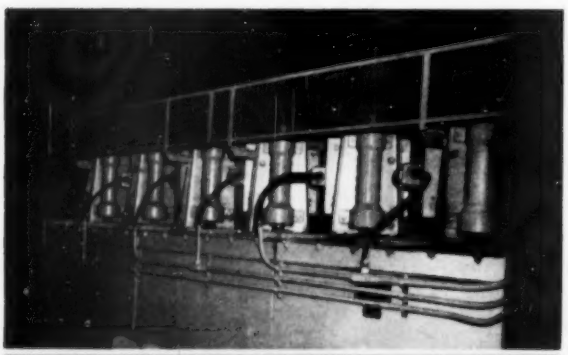
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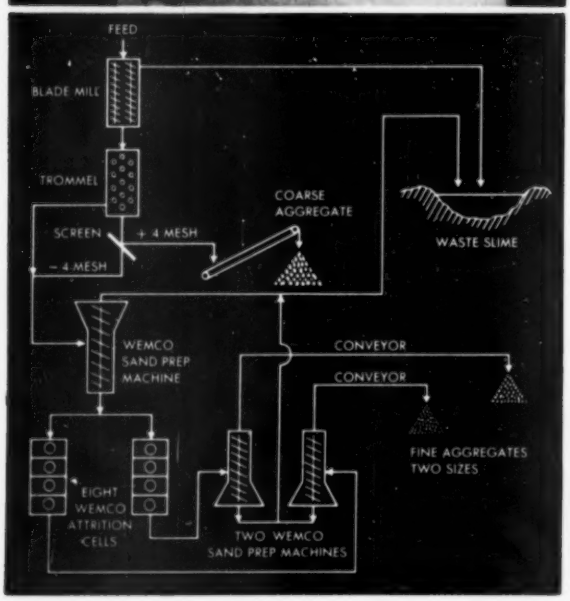


If you have a clay problem—

Here's Proof of how **WEMCO** ATTRITION MACHINES

break down cemented materials





The above photographs clearly illustrate how the Wemco Attrition Machine removes clay cementing material from sand particles in the plant of a California aggregate producer. With ordinary scrubbing methods this producer was unable to break down the cementing material present in order to meet State aggregate specifications. After installation of Wemco Attrition Machines, this operator was able to scrub loose the cementing material and then remove it by desliming. Note the clean, sharp sand particles produced in the process. The result was a higher profit aggregate of greatly improved quality which fully complied with State specifications.

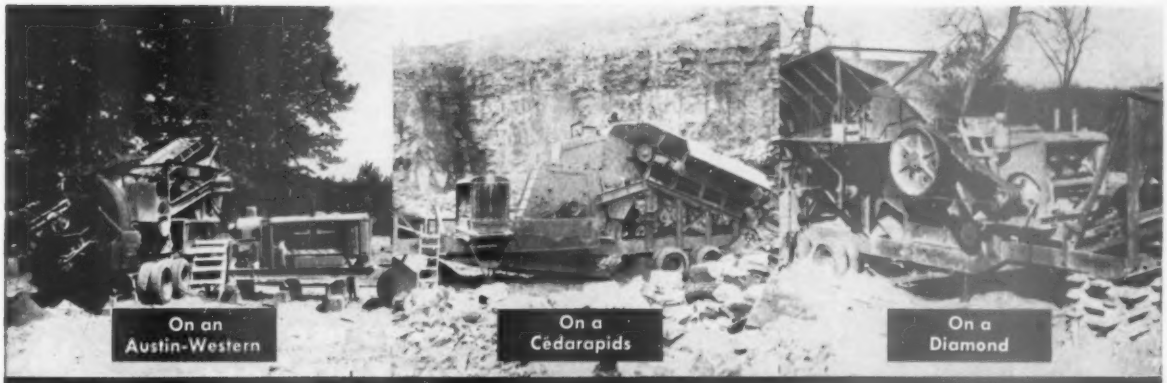
The Wemco Attrition Machine is a new and more efficient method of washing sand particle surfaces by controlled turbulence of high density pulps. Its thorough abrading action literally scrubs the clay from sand particles more completely than methods formerly used and permits the recovery of clean aggregates for marketing.

Flowsheet of aggregate plant shows use of eight Wemco Attrition Machines in conjunction with two No. 48 Wemco Sand Preparation Machines. Previous to installation, operator was unable to meet fine aggregate specifications.

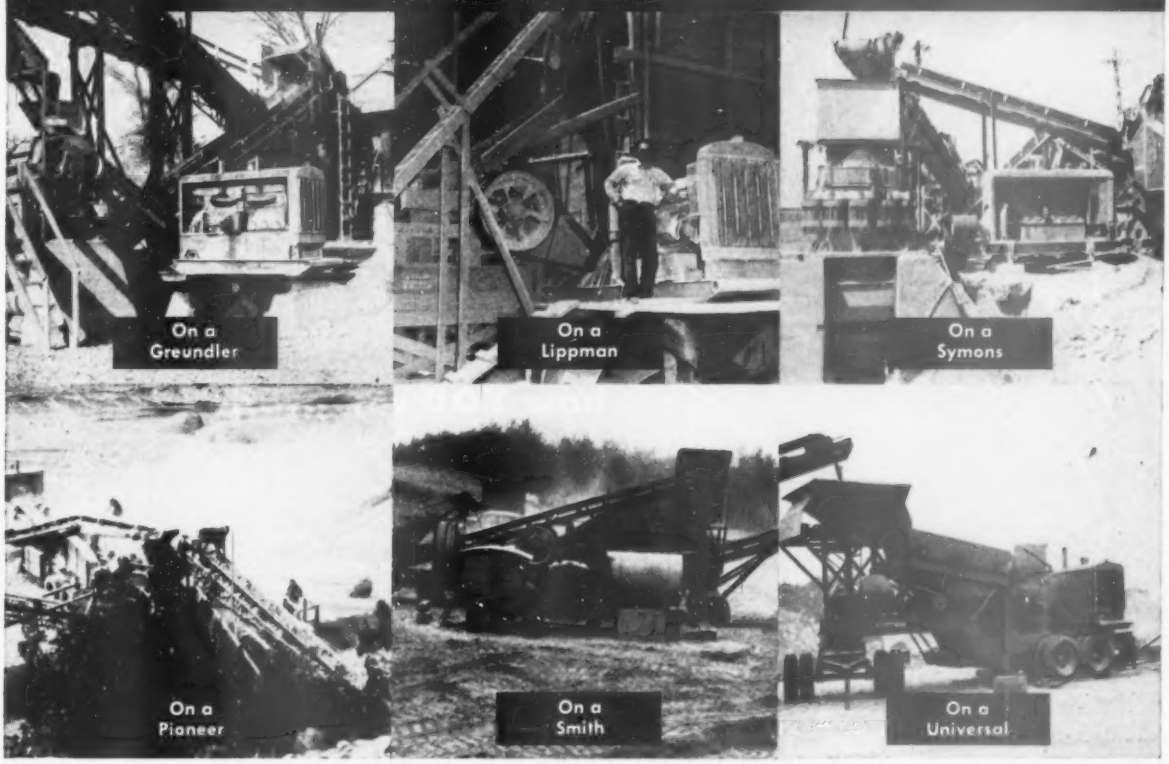
WRITE WEMCO TODAY for further information on how Wemco Attrition Machines can improve your aggregate operations. Wemco facilities are available for attrition tests on your samples, if desired.

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Engines and power units 90 to 240 H.P.; generator sets 60 to 140 K.W.

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NEW USE FOR AN old salt...

that saves money for cement makers*

Most cement is made by a process of "put 'n take." *Put* in lots of water to make the raw materials pumpable. Then, *take* all the water out to produce the dry, finished cement. The problem is to use as little water as possible and yet keep the mixture fluid. Victor Sodium Tripolyphosphate does the trick. Less than 1% of Victor "tri-poly" helps water carry far more raw cement particles. This enables cement makers actually to increase production around 10%, without adding new equipment . . . all this from the use of this versatile Victor chemical.

how YOU can profit from VICTOR CHEMICALS

Finding faster, lower cost, or better methods of producing better goods has been our objective for 55 years. The helping hand of Victor's research department and the excellence of Victor chemicals are well known to all industry, from agriculture to atomic energy . . . from food to pharmaceuticals. If you have a process or product problem that chemistry might solve, we suggest that your men get together with ours. Victor Chemical Works, 141 W. Jackson Blvd., Chicago 4, Ill. In the West: A. R. Maas Division, 4570 Ardine St., South Gate, Calif.

**Note to Cement Makers: For details, write for technical bulletin V1-53.*

VICTOR

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*Editor's page.....

Factors in Competitive Selling of Cement

THE RECENT DECISION of the federal government to dismiss its eight year complaint against the portland cement industry, and the Federal Trade Commission's expressed belief that sellers of commodities like cement and steel have the right to absorb freight in order to meet competition in good faith are significant to the cement industry and all users of cement.

Changed conditions affecting competitive selling, however, will limit the portland cement industry's ability to reach out for business as the need may arise with a buyer's market, and the practice of freight absorption will not be the answer to holding up volume that it has been in the past when competition was tough.

Nevertheless, this reversal in thinking on the part of the F.T.C. may clear up much confusion. The F.T.C. now has declared "that the right to meet a lower price which a competitor is offering a customer, when done in good faith, is the essence of competition and must be permitted in a free competitive economy."

There is every indication that business is to be subject to less pressure and that the government will now prefer not to initiate anti-trust cases but settle differences of opinion out of court. Defense against price discrimination apparently will hinge on proof of "good faith" when sellers make adjustments to meet competitive prices. Congress likely will support that thinking.

F.T.C. Reversal

When the F.T.C., eight years ago, questioned the right of a seller to meet competition in good faith without being in violation of the law against discrimination in prices, cement companies were accused among other things of refusing to sell f.o.b. mill if buyers so requested and of refusing to permit buyers to use truck transportation without being discriminated against in prices.

Complete reversal in its belief has been justified by the F.T.C. on the grounds that changes in the cement industry and its selling practices have accomplished F.T.C. objectives. The fact that many companies are selling f.o.b. mill and using truck transportation has been interpreted as proof of healthful competition.

This trend to truck delivery has been a growing development that has had nothing to do with any change in practice **because** of the case against the industry. It has resulted because companies were competing actively for business even in a seller's market, on the basis of service and price and in a desire to intrench themselves for the future. Modest price increases for cement as compared to other commodities during recent years of a seller's market are proof of that.

The question now is how important will be the practice of keeping volume up, and overhead down, through freight absorption, in competing for business, should highly competitive conditions arise. We now have a competitive situation that shows some tightening, with plant capacity at an all-time high, which suggests that increasing pressure will bear on marginal companies and those with older and less efficient plants.

Competitive Marketing

While there appears to be no immediate prospect of a general decline in demand for portland cement on a national scale, supply and demand are coming into easy balance in some areas of the country and there are those who predict a general let-up in business. A good year is expected for 1954 but the indications of a changed competitive situation suggest that the industry be prepared to profit from past experience.

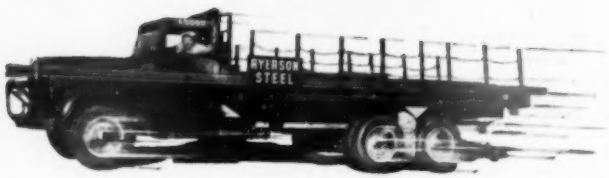
Hitherto, when there has been a shift from seller's to buyer's markets, the chief aim of the manufacturer has been to put great emphasis on the volume factor of low unit cost. He has aimed to keep his unit cost down by taking more and more unprofitable business through going farther and farther afield for his orders. The objective was to cut costs on his profitable sales.

There are other ways of reducing unit cost if such reductions are planned far enough in advance and operations carefully planned with that in view, such as plant re-arrangements for part-capacity operations. The general let-up in housing construction, predicted by some authorities suggests re-appraisal. This, in the aggregate, which comprises dealer and ready-mixed concrete business, probably accounts for a very considerable percentage of total cement production today.

With all the new factors in the situation which include increased freight rates, new freight rate differentials, motor truck shipments which have greatly increased and various state laws limiting truck loading, manufacturers need to pay more attention than ever to economical operation at part-capacity and in other elasticity in operating technique. This seems a logical solution, and new plants have been designed with that in mind.

Bror Nordberg

For quick delivery





of steel



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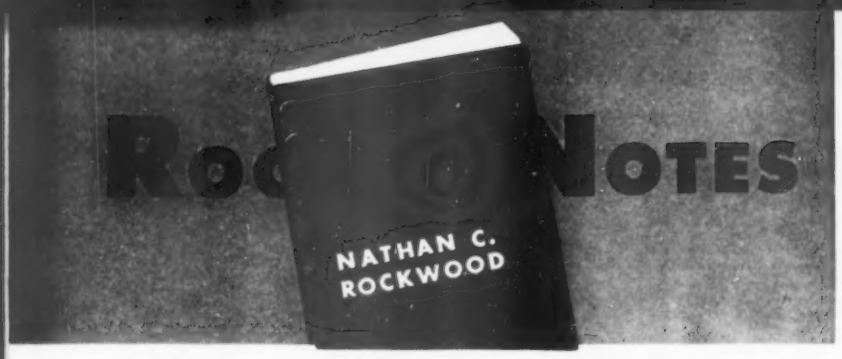
With a network of 15 strategically located plants Ryerson brings quality steel quickly to your door. Although some stocks are currently unbalanced from a size standpoint, when you need steel—any kind or quantity—call the Ryerson plant nearest you and we will do our best to meet your every need.

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"Crystal Chemistry in Ceramics"

WHILE WE WERE STRUGGLING to explain the chemical structures of minerals involved in portland cement, aggregates and concrete to other laymen like ourselves, a very excellent summary designed to serve more or less the same end, unfortunately, was not known to us. This is a series of articles entitled "Crystal Chemistry in Ceramics," published as a reprint from the *American Ceramic Society Bulletin*, which became available early in 1951. The author is Prof. W. E. Hauth, Jr., of Iowa State College. Our friend, Stanton Walker, of the National Sand and Gravel Association, kindly called the series to our attention; which, incidentally pleases us very much because it appears that our own efforts have succeeded in interesting at least one other engineering layman. We are quite serious in our belief that not a great deal more progress will be made in concrete research until all such research engineers have gained at least an elementary knowledge of the structural or crystal chemistry of the ingredients of concrete as well as that of the concrete itself.

Prof. Hauth's series of eight articles is more scientific and technical—and consequently more authoritative—than ours, and the illustrations much more understandable. The series in bulletin form can be obtained from the American Ceramic Society, 2525 North High St., Columbus 2, Ohio, for one dollar a copy, and for any of our readers who are really interested in this subject, we especially recommend their acquiring a copy. The titles of the eight articles are: I. Introduction to Crystal Chemistry; II. Coordination Theory and Crystal Bonds; III. Pauling's Rules and Basic Silicate Structures; IV. The Ortho, Pyro, and Meta Silicates and Amphiboles; V. The Sheet Structure Minerals and Feldspars; VI. The Clays and Mica; VII. Polymorphism; VIII. The Crystal Chemistry of Glass. Probably the only term that readers of our articles may be unfamiliar with is polymorphism, which we will attempt to explain a little farther along.

Same Minerals in Concrete

Portland cement manufacture is of course a ceramic industry, dealing with combinations of ceramic raw materials in a somewhat different way than in the manufacture of clay products and glass. Nevertheless, the same minerals and thermal reactions are involved, but the ceramic chemist is not so much interested in calcium or lime as the cement chemist. Hence, a sentence from Prof. Hauth's introduction should be sufficient to interest the cement and concrete specialist as well as those in the ceramic industry. He writes: "This series of articles is designed to afford a readily comprehensible presentation which will provide the basic concepts necessary for an understanding of the crystal chemistry of ceramic materials." Accompanying each article is a rather complete list of references for those who desire to pursue the subject in more detail.

One could not state more clearly and concisely the basic theory involved than in the following quoted paragraph: "In general the physical and physical-chemical properties of a mineral are dependent upon two crystallographic factors: (1) the predominant type of bonding between atoms and groups of atoms and (2) the fundamental crystallographic groups which go to make up the structure and the manner in which these groups share elements (corners, edges, and faces). Both factors resolve, in the final analysis, into a consideration of the strength of the bonds between the atoms. Strong bonds between atoms give rise to highly refractory hard crystals, and weak bonds to soft crystals with low melting points. A combination of strong and weak bonds results in characteristic cleavages and contributes to the size and shape of the particle. Therefore, a knowledge of the types of bonding and the structural configuration of the minerals is a valuable tool in the studying of mineral properties."

Without the benefit of such a clear general statement, we have endeavored, in our current series of articles, to bring out this fact in our discussions of the bonding of the elements in cement and concrete. The ceramic industrialist designs to bring about his bonding by high temperatures at which the atoms and ions are so agitated that new combinations and high strength bonds are readily achieved. The cement manufacturer in the making of portland cement clinker particles aims at bonds attained by high temperatures, which are readily broken or dissolved in the presence of water. The concrete engineer, on the other hand, is dealing with materials the bonding of which is wholly dependent for the rearrangement and linking of atoms, ions, or aggregations of them, upon a liquid composed of both solutions and sols of some or all of the elements. Consequently the bonding in concrete appears destined to be composed of many weak bonds of the hydroxyl (OH) type. Apparently then concrete will never be a strongly bonded conglomeration of minerals until ways are found to change such hydroxyl bonds ultimately to something better.

The Excess Water Problem

Thus there is a very basic reason why excess water in concrete is detrimental to its quality. In a burned clay product all the water has been removed, and hence from a structural point of view the lattices have superior bond strengths compared to concrete. However, of course, water can be absorbed from without by a clay product as well as by a concrete product, and a clay product can be injured by freezing and thawing as well as a concrete product. Water retained in hydrated cement, and hence in concrete, does have a special affinity or attraction for more water, and this water, as well as the residual water retained during hydration is more firmly held and probably can be more destructive than ordinary absorbed water.

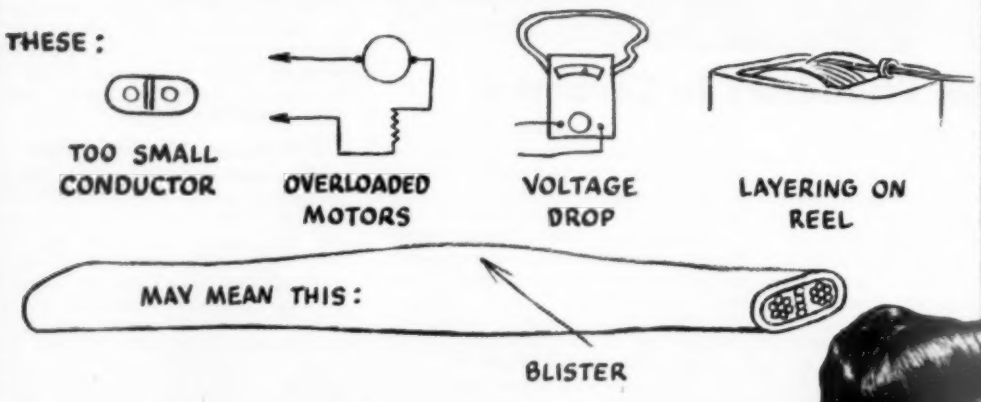
It is known, of course, that concrete made under high pressures can be the equal in strength and resistance to any mineral product, natural or artificial. The reason for this is apparently that all the excess water *and air* have been squeezed out, and the mineral particles are in such close contact that chemical bonds other than those of the hydroxyl type take over. Prestressing and the vacuum process of concrete construction are probably helpful in this respect. These processes can never be used for much massive or even ordinary concrete construction, but the reduction of mixing water to a minimum and thorough and heavy tamping are certainly practicable, when and if proper machinery and equipment are developed for handling and placing such dry mixes.

Polymorphism

This term means that numerous minerals in crystal form are capable of existing in a number of different ionic crystalline organizations, depending upon the temperature, pressure, and the presence of impurities. The best known of such minerals is silica, with which all who study cement and concrete are familiar. From the mere application of heat, silica crystals change the organization or lattice structure, made up of the ions of silicon and oxygen, from low quartz, to high quartz, low tridymite, lower high tridymite, upper-high tridymite, low cristobalite, high cristoba-

(Continued on page 132)

HOW TO SPOT DAMAGE FROM CURRENT OVERLOAD . . .





. . . AND WHY THERE'S GREATER HEAT STAMINA IN ANACONDA'S NEW MINING MACHINE CABLE

Blisters, formed by gases from overheated insulation, are a sure sign of cable overloading. A torn cable may result. Since you can't always control overloads, it's important to choose *quality* cable.

Today, due to better design, jackets and insulation, good cables shouldn't cook on the reel the way they used to. But this only makes overloads harder to detect. They still may be present . . . caused by too small a conductor, overloaded machines, voltage drop or even layering of the cable. With 4 layers on the reel, according to I.P.C.E.A., unventilated bottom layers lose 65% of capacity.

WHY THE NEW ANACONDA CABLES ARE SAFER

First, they are more flame-resistant. Jacket is made from a new neoprene formula. Improved cold-rubber insulation gives greater heat stamina. Patented breaker strip* insures a safer ground. No ANACONDA Cable has ever failed a U. S. Bureau of Mines flame-test!

CABLE LIFE NOW MUCH LONGER

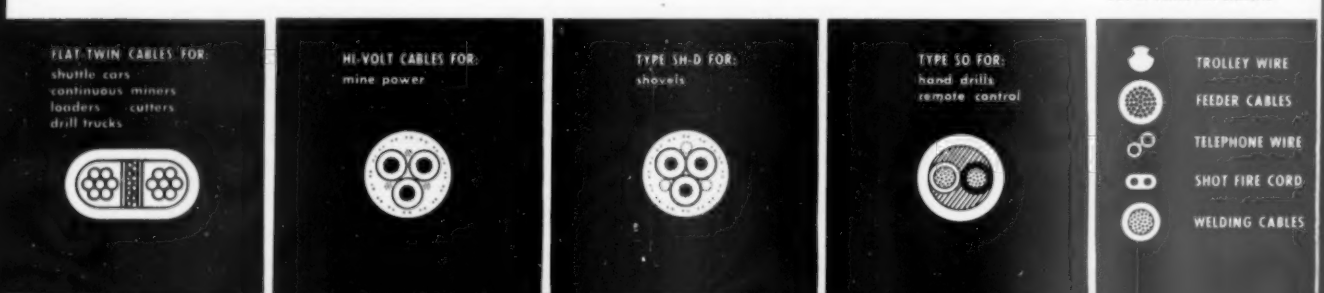
In 15 mines recently surveyed, ANACONDA Cables on shuttle cars are lasting up to 300% longer than cables made only a few years ago. Together, jacket and insulation protect these cables better—especially in wet mines where sliver-cuts can cause shocks. The cables are tougher. New-type stranding flexes better under tension.

All this means economy because *one* break in cheap cable costs more than you can save by buying on price. For a sample of this new cable, call your Anaconda Sales Office or Distributor. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

ANACONDA®

TODAY'S HEADQUARTERS FOR MINE CABLE

*U. S. Patent No. 2,455,773



LABOR RELATIONS TRENDS

Management Rights to Fire Maintained by U.S. Circuit Court of Appeals

By NATHAN C. ROCKWOOD

THE DECISION of the U.S. Court of Appeals, Fifth Circuit (New Orleans, La.) on August 6, 1953, in the case of an appeal by the National Labor Relations Board to enforce its order on the United States Gypsum Co., should give encouragement to all employers that at least some of their rights to hire and fire for good and sufficient reasons will be maintained in spite of union influence and interference. Following is the text of the court's decision, which is for once really interesting and amusing in places where it lacks only the use of Southern Negro dialect to be entertaining.

"This case is before the court on petition of the National Labor Relations Board, seeking enforcement of its order requiring respondent to cease and desist from discouraging membership in any labor organization of its employes by discriminatorily discharging or refusing to reinstate, or failing to recall any of its employes; from interrogating its employes concerning their union membership, activity, or attitude; and from interfering with, restraining, or coercing its employes in the exercise of their right to self organization. The Board's order affirmatively directed respondent to offer to reinstate and to make whole three employes whom the Board found to have been illegally discriminated against in regard to their hire or tenure of employment, and to post appropriate notices on the plant premises.

"The questions presented for our determination are: (1) whether the Board properly included in its complaint allegations that respondent discriminatorily laid off and refused or failed to reinstate Bennie Pearson and Paul Johnson; (2) whether the Board properly found that respondent discriminatorily laid off or refused to recall Paul Johnson, Hiram Peoples, and Bennie Pearson because of their union activity; and (3) whether the Board erred in finding that the respondent unlawfully interrogated and threatened its employes. A fourth question is presented by respondent's motion for leave to adduce additional evidence with respect to the organization and existence of a local union at respondent's Greenville, Miss., plant, which local allegedly had not complied with subsections 9(f), (g), and (h) of the National Labor Relations Act, as amended.

Complaint and Charge

"The first point concerns a variation between the timely amended charge filed by the union, the International Woodworkers of America, C.I.O., and the complaint issued by the Board. Respondent contends the unfair labor practices alleged in the complaint occurred more than six months prior to the filing of the second amended charge and the Board was prohibited by section 10(b) of the Act from issuing a complaint based thereon. The amended charge filed on April 25, 1949, in so far as here important, alleged generally that respondent had engaged in unfair labor practices within the meaning of section 8(a) (3) of the Act by discharging Flannigan Harper and Hiram Peoples, on April 10, and February 6, 1949, respectively, because of their membership in and activities on behalf of the International Woodworkers of America, C.I.O., a labor organization. Respondent concedes that this charge was timely filed. Thereafter, on April 17, 1950, the second amended charge was filed by the union, reiterating the allegation that respondent had violated section 8(a) (3) of the Act but deleting the name of Flannigan Harper and alleging, in addition to Hiram Peoples, that respondent laid off and refused to employ Bennie Pearson and Paul Johnson, on February 5, 1949, and January 26, 1949, respectively, all because of their membership in and activities on behalf of the union. In N.L.R.B. v. Cathey Lumber Company, 5 Cir., 185 F. 2d 1021, affirming per curiam 86 N.L.R.B. 157, set aside on other grounds, 189 F. 2d 428, the charge named three employes as having been discharged in violation of Section 8(a) (3) of the Act. The complaint, which was issued more than six months after the discharges in question, named 17 additional employes as having been discharged at the same time. There, as here, the employer contended that the complaint was invalid but we did not think so. We reaffirmed our view on the subject in Stokely Foods, Inc. v. N.L.R.B., 5 Cir., 193 F. 2d 736. See also N.L.R.B. v. Westex Boot and Shoe Co., 5 Cir., 190 F. 2d 12, 13-14. Respondent has presented nothing new on the issue. Accordingly, we adhere to our former decisions.

"As to respondent's second point, we are of opinion that substantial evidence on the record considered as a whole supports the Board's findings that because of his union activities respondent discriminatorily failed to re-employ Hiram Peoples. On the other hand, a fair estimate of the entire evidence leaves us firmly of the conviction that there is a lack of substantial evidence to support the Board's finding of discriminatory termination of the employment of Bennie Pearson and Paul Johnson. On the contrary, we think the evidence overwhelmingly indicates that these two men were laid off and not recalled because they were unusually poor workmen.

Findings as to Layoffs

"Bennie Pearson was employed in the board mill as a grinder operator. All of the evidence on the subject discloses that Pearson was a shiftless, undependable, habitually tardy employe, who had been admonished for his failings on numerous occasions and had failed to mend his conduct. Isac Carter, an hourly-paid fellow employe in the grinding room, testified that Pearson could not operate a grinder because he would let it run empty and was late for work most of the time. G. M. Vaught, the superintendent of the board mill, warned Pearson several times that if he did not cease his tardiness and perform better on the job, foreman Mauceli was going to lay him off and he, Vaught, would not interfere. In response to a question as to the factors taken into consideration in selecting men to be laid off, Joe Mauceli stated that in Pearson's case 'It didn't take long. He was just the sorriest man I had.' He also testified that he had threatened Pearson with discharge if he did not come in on time. Another shift foreman, Clarence Sheppard, swore that Pearson was laid off for the reason that he was not dependable and would permit his grinder to run empty. James Bentley, at the time of his testimony the proprietor of a furniture store in Saltillo, Miss., but formerly employed by respondent in the grinding room, classified Pearson as a poor workman. Indeed, Bennie Pearson's own testimony revealingly corroborates the testimony offered by respondent's witnesses:

"'Q. Didn't he Mauceli tell you that if you didn't do better and get to work on time that he'd have to let you go?

"'A. That's right.

* * * * * * * *

"'Q. Quite a number of times you would be late, wouldn't you?

"'A. I was on time more times than I was late.

"'Q. About 50-50?

"'A. Yes, sir.

"'Q. Would that be about right?

"'A. Yes, sir.'

Paul Talked Too Much!

"Turning now to Paul Johnson, the testimony of fellow workmen and superiors again combines to clearly indi-

(Continued on page 128)



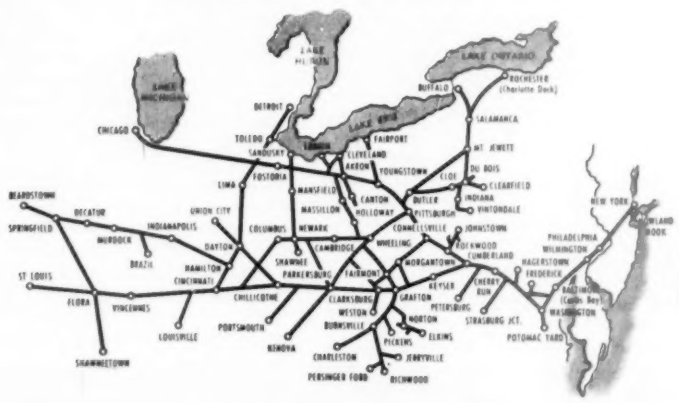
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• In fact, you can write *your own* ticket—for the vast Bituminous fields served by the Baltimore & Ohio contain excellent coals *in wide variety*. For centuries to come, these coals will be available—a dependable source of low-cost heat and energy.

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PEOPLE in the news

Sales Representatives

JAMES A. WHITE has been appointed sales representative for Calaveras Cement Co., San Francisco, Calif., in the counties of Stanislaus, Merced, Mariposa, portions of southern San Joaquin and northern Madera, including the towns of Manteca, Escalon, Chowchilla and Califa. A graduate in engineering and business administration from the University of Missouri, Columbia, Mo., Mr. White has been with the company since August, 1952.

Harold Lovegreen has been named white cement sales representative in southern California, western Nevada, Arizona and Utah, with headquarters in Los Angeles. Formerly with the San Francisco office, Mr. Lovegreen received his engineering degree from the University of California.

C. of C. Chairman

FRANK E. MCCASLIN, president of the Oregon Portland Cement Co., Portland, Ore., is chairman of the 1953-54 Committee on Natural Resources of the Chamber of Commerce of the United States. He is also a member of the board of directors. Ralph L. Dickey, president of The Kelley Island Lime and Transport Co., Cleveland, Ohio, is also a member of the Committee, and both Mr. McCaslin and Mr. Dickey are members of the subcommittee on Minerals and Metals. The committee is composed of 42 members who represent all types of natural resource industries and related fields of energy supply, conservation and land utilization.

Landscaper

FRANK B. THACHER, president of the Carbon Limestone Co. and the Carbon Concrete Brick Co., Youngstown, Ohio, is a man of vision. His company owns and leases 2000 acres of land from which an annual volume of 1,500,000 tons of limestone are taken. But as the company takes out one natural resource, it is also planning for the future, and has begun a reforestation program on the land from which the limestone has been taken. Fifteen thousand trees a year are being planted—ash, oak, maple, tulip and pine, and another acre will be planted in chestnuts. "Those trees won't do me much good in my time," Mr. Thacher says, "but future generations will benefit. We can't put back the limestone, but we can build up a rich natural resource for the future."

Born in Odessa, Mo., Mr. Thacher was graduated from the University of Missouri in 1911 with a B.S. degree in mechanical engineering. He was captain of the football team in 1910 and played guard and tackle on the 1909 team. After graduation, he taught mathematics and coached football at Wentworth Military Academy, Lexington, Mo. Later he worked at the Gary, Ind., coke plant of the Illinois Steel Co., subsequently becoming superintendent of the by-product department. He transferred to the Toledo Furnace Co. where he built and operated a coke plant. Then he returned to Gary as assistant superintendent of the coke plant in charge of operations. From there he went to Chicago as general manager of operations of the Interlake Iron Corp. Later he joined the Great Lakes Carbon Corp., doing special research and development work on petroleum, and subsequently became manager of the electrode division at Niagara Falls, N.Y. He left there in 1948 to become president of the Carbon Limestone Co.



Frank B. Thacher

District Sales Manager

FRANK E. PHILLIPS, JR., has been appointed manager of the New Orleans district sales office recently opened by National Gypsum Co., Buffalo, N.Y. The new office will cover Louisiana and southern Mississippi, which was formerly divided between the sales offices in Texas and Alabama.

Heads Central Research

DR. H. N. STEPHENS has been elected vice-president in charge of central research for the Minnesota Mining and Manufacturing Co., St. Paul, Minn. He has been in charge of the central research laboratory since 1937.

Works Engineer

JAMES W. CAMERON has been appointed works engineer for the Maple Grove, Ohio, plant of Basic Refractories, Inc., Cleveland, Ohio. He was recently project engineer in construction and operation of the processing plant station of the U.S. Rubber Co. at Mishawaka, Ind. In his new position, Mr. Cameron will integrate plant maintenance procedures for the quarrying, crushing, and burning plant operations. He will also be in charge of engineering connected with maintenance and construction of new facilities. A native of Trenton, Mich., Mr. Cameron is a graduate of Ohio Northern University with a degree in mechanical engineering.

Joins Chemical Firm

NELSON F. J. BRAMER, formerly assistant chief chemist at the Nazareth, Penn., plant of Hercules Cement Corp., Philadelphia, Penn., has been appointed to handle sales of cement mill products in the eastern seaboard states for Dewey and Almy Chemical Co., Cambridge, Mass., where he will make his headquarters. He was previously with the Penn-Dixie Cement Corp. A 1937 chemistry graduate of Muhlenberg College, Allentown, Penn., Mr. Bramer also studied mechanical engineering at Michigan College of Mining and Technology.

Named Vice-President

JACK E. CALDWELL has been named vice-president and assistant general manager of the Washington Brick and Lime Co., Spokane, Wash., in addition to his duties as sales and operations manager, according to an announcement by Neal R. Fosseen, president. Louis W. Rucker, office manager, has also been appointed assistant secretary. Directors of the firm include Neal R. Fosseen, Walter A. Toly, Charles P. Lund, W. W. Witherspoon, Eric A. Johnston, Howard Wall, W. F. Lauhman, V. B. Kelsey and W. J. Goodwin.

50 Years in Lime Industry

CLARENCE FULMER, general superintendent of G. & W. H. Corson, Inc., Plymouth Meeting, Penn., is celebrating his 50th year in the lime industry, 30 of which were spent as superintendent of the Corson plant. It is interesting to note that in 1903, when Mr. Fulmer started his career, lime plant employes were receiving 13c to 15c per hour. Twenty tons of rock were crushed during a 12-hr. day, using hand sledges, and lump lime sold at $6 to $7 per ton.

Committee Chairman

THERON C. TAYLER of the Tayler Engineering Service, Detroit, Mich., is chairman of a committee of the Michigan Society of Professional Engineers, designed to foster and promote international reciprocity of engineering registration. At a recent meeting of the society, a resolution was made to recommend to the Michigan State Board of Registration for Architects, Engineers and Land Surveyors to undertake a study of the problems involved, with the objective of setting up a working basis for international reciprocity for professional engineers. Reciprocity is already in effect with Ontario, and other Canadian provinces are now considering it. The architects of Michigan have appointed a committee to consider joining the movement, and engineers and professional men of other states are giving it consideration.

Division Managers

MELVIN F. CERRUTI, formerly district manager in the New York office of National Gypsum Co., Buffalo, N.Y., has been promoted to northeastern division manager for the districts of Boston, New York, Garwood, Philadelphia and Washington. Mr. Cerruti is a member of the Trailblazer Club, a group of employes who have been with the company 25 years or more. C. Gustavus has been appointed manager of the southwestern division, which is composed of the Houston, Dallas, Kansas City and St. Louis sales districts, also the New Orleans sales district. Formerly director of trade relations in the southwest, Mr. Gustavus has been with the company since 1942.

Elected Vice-President

WILLIAM C. DUANE, chief chemist and engineer of The Carney Co., Inc., Mankato, Minn., has been elected a vice-president of the firm. He joined the company in 1938 as a chemist and has been in charge of product control and new product development. Other officers are H. E. Carney, Jr., president; G. F. Kiewel, vice-president and treasurer; T. P. Walters, vice-president of production; W. B. Lee, vice-president; and Mary R. Gaffey, secretary.

Consulting Engineer

JOHN R. SNOWBALL has been appointed consulting engineer to The Marietta Concrete Corp., Marietta, Ohio. He was formerly housing and products engineer for the Columbus, Ohio, office of the Portland Cement Association. An authority in the field of structural and precast concrete, Mr. Snowball has devoted his life to the concrete business. He is a graduate of Purdue University with a B.S. degree in civil engineering. He was maintenance engineer for the New York Central railroad, was a design engineer for the Truscon Steel Co., served as chief engineer for the Prest-O-Lite Co., and was associated with the firm of Esselstyne-Murphy-Hanford, architectural engineers of Detroit, where he designed the Belle Isle bridge. He became associated with the Portland Cement Association in 1925. Four years later he joined the Norwood Construction Co., Cincinnati, Ohio. Following this, he was appointed a traveling engineer with the Public Works Administration with headquarters in Chicago. In 1940, he returned to the Columbus office of the P.C.A.

Chief Engineer

ARVIN S. WELLBORN, formerly managing engineer of the Pacific Coast



Arvin S. Wellborn

division of The Asphalt Institute, New York, N.Y., has been promoted to chief engineer, with headquarters in New York.

Named Vice-President

L. H. OPPENHEIM has been appointed a vice-president of the Henry J. Kaiser Co., Oakland, Calif., in addition to his duties as assistant general manager of Kaiser Engineers, a division of the company. Mr. Oppenheim joined the Radum plant as plant engineer in 1938 on receiving his civil engineering degree from the University of California. Later he became assistant chief engineer of the iron and steel division of Kaiser Co., Inc. In 1944, he was appointed assistant chief engineer of Kaiser Industries.

Division Manager

R. MELVIN POTTENGER has been appointed manager of the ready-mixed concrete division of the Brighton Sand and Gravel Co., Sacramento, Calif. Mr. Pottenger has been in the construction industry in the Sacramento area for the last 25 years. He served as manager of a sand and gravel company for six years and in 1952 was part owner of a ready-mixed concrete firm in Sacramento.

District Engineer

W. J. MCINTOSH has been appointed district engineer in charge of the New York office of the Portland Cement Association, Chicago, Ill., and will direct activities in New York, New Jersey and Connecticut. He succeeds John F. Hall, who has resigned. Mr. McIntosh joined the P.C.A. in 1946 as a field engineer in the Philadelphia district. Three years later he was appointed regional highway engineer and served the Philadelphia and Columbus districts. Mr. McIntosh, who is a registered engineer in Pennsylvania, studied civil engineering at the University of Wisconsin Extension School. During World War II, he served in the Pacific theater of operations as commander of the 15th Special U.S. Naval Construction Battalion. Prior to the war, he was with the Pennsylvania Highway Department.

On Research Staff

JOHN C. HAYES has been appointed to the staff of the Evanston research laboratories of the Zonolite Co., Chicago, Ill. He will conduct research on the fundamental chemical properties of vermiculite as used in cement and gypsum. For the past six years, Mr. Hayes did fundamental chemistry research for the Portland Cement Association. He graduated from Wheaton College in 1946 and received his master's degree in chemistry from Northwestern University in June, 1953.

Member of Board

INNIS O'ROURKE has been elected a member of the board of directors of the New York Trap Rock Corp., New York, N.Y. A graduate of Yale University, Mr. O'Rourke is president of the Concrete Conduit Corp. and Precast, Inc., Corona, N.Y.

Joins Consulting Firm

DR. ELWOOD S. MOORE, Toronto, Canada, has been appointed an associate of Behre Dolbear & Co., New York, N.Y., mineral consultants in mining, metallurgy, geology and management.

Receives Honorary Degree

E. D. WILLIAMS, president of the Millard Lime and Stone Co., Annville, Penn., received the degree of Doctor of Laws from Lebanon Valley College.

Director of Ideal

WILSON MCCARTHY, president of the Denver and Rio Grande Western Railroad, has been elected a director of Ideal Cement Co., Denver, Colo.

Concrete Pipe Promotions

VIRGIL M. BROTTON has been appointed secretary-treasurer of the Universal Concrete Pipe Co., Columbus, Ohio. He was formerly assistant treasurer and comptroller. William H. Deibel has been named assistant treasurer. Other personnel changes include J. C. Merritt who has taken over management of the machine and fabricating shops in addition to having charge of company purchases, with George Grimes continuing as purchasing agent. C. G. Hayes is superintendent of the machine shop and R. H. Fox is in charge of the fabrication shop. T. H. Monaghan has been appointed manager of sales promotion and public relations in addition to his duties as advertising manager. A. G. Cochran is manager of the sales and production control department. Walden Wren is assistant manager and chief engineer, and William Curtis is acting manager of the Columbus plant. Harold Leuliette has been appointed district manager for the plants at Port Washington, N.Y., Kenvil, N. J., Philadelphia, Penn. and Baltimore, Md., and Elmer Leuliette, formerly manager at Kenvil, will handle sales promotion in the eastern area.

Named Sales Aide

ROBERT A. COSTA, who for the past three years has been administrative assistant to the general sales manager of Kaiser Gypsum, a division of Kaiser Industries, Inc., Oakland, Calif., has been appointed assistant general sales manager of the division. He was formerly administrative assistant to the chief engineer of the Arabian American Oil Co. in San Francisco. Prior to that, he served with the U.S. Navy as ship's executive officer and intelligence officer. Mr. Costa is a graduate of the University of San Francisco.

A.S.T.M. Director

KENNETH B. WOODS, associate director of the Joint Highway Research Project and professor of highway engineering at Purdue University, Lafayette, Ind., has been elected a member of the board of directors of the American Society for Testing Materials for a term of three years. Born in Sunnyside, Wash., Prof. Woods received his degree in civil engineering from Ohio State University in 1932 and his professional degree in civil engineering in 1937. He is a registered professional engineer in the states of Ohio and Indiana. Prof. Woods began his association with Purdue University in 1939 as assistant professor of highway engineering, and became professor of highway engineering in 1946. In 1939 he was also assistant director of the Joint Highway Research Project, becoming associate director in 1945. Prof. Woods was presented the 1945 Highway Research Board award for a paper of outstanding merit on highway materials and in 1949 received the Distinguished Service Award of the Highway Research Board.

Prof. Woods is a member of A.S.T.M. committees D-4 on road and paving materials and D-18 on soils for engineering purposes; chairman of committee C-9 on concrete and concrete aggregates; and served on the administrative committee on papers and publications. He is a member of the American Concrete Institute, American Road Builders' Association, American Society of Civil Engineers, The Society of American Military Engineers, The American Society for Engineering Education, U.S. Council on Soil Mechanics and Foundation Engineering, and others.

Service Engineer

HENRY B. SCHMIDT has joined the Virginia Ready-Mix Concrete Co., Virginia, Minn., as service engineer. A registered professional engineer, Mr. Schmidt received a bachelor's degree in civil engineering in 1942 and a master's degree in 1947 from the University of Minnesota. For the past year he was assistant chief of the foundations and materials branch of the Chicago District, Corps of Engineers. His experience in the construction field includes three years' service during World War II with the Army Engineers in the Aleutian and Philippine Islands, four years in the Minneapolis district office of the Portland Cement Association, and one year in Turkey as soils and materials engineer on airfield construction.

OBITUARIES

JOHN SHEPHERD THOMSON, president of the Nevada Concrete Pipe Co., Sparks, Nev., died September 7 at his home in Marysville, Calif. He was 73 years old. Mr. Thomson, who was also a director of the Valley Concrete Pipe and Products Co., Yuba City and Chico, Calif., held many patents for machinery used in the manufacture of concrete pipe. A native of Douglastown, Scotland, he had lived in Marysville since 1917.

GAYLORD E. GRAY, president of the Des Moines Sand and Fuel Co., and the Central Iowa Sand and Gravel Co., Des Moines, Iowa, died September 1 at the age of 60. Born in Des Moines, Mr. Gray attended the University of Wisconsin, Madison, Wis., Drake University, Des Moines, Iowa, and the State University of Iowa at Iowa City. He entered the sand and gravel business in 1915.

JOHN S. KENNEDY, SR., widely known consulting engineer for the Portland Cement Association, Cleveland, Ohio, died September 12 at his home in Novelty, Ohio, after a two months' illness. He was 57 years of age and had been associated with the P.C.A. for 17 years. Mr. Kennedy received his B.S. degree in civil engineering from the University of Akron in 1918. He was president of the Ohio Society of Professional Engineers in 1942 and for many years was a member of the board of directors of the national society.

FRANK I. HEFFERNAN, superintendent of the Steilacoom, Wash., plant of the Glacier Sand and Gravel Co., Seattle, Wash., died suddenly on August 28. An expert in gravel plant operation, Mr. Heffernan had been manager of the Steilacoom plant for more than 25 years and was widely known throughout the Pacific Northwest.

FRANK J. GOGAN, vice-president of the Great Lakes Concrete Pipe Co., Buffalo, N.Y., died suddenly on August 20. He was 48 years old and had been associated with the company for 20 years, serving as vice-president for the past five years. Mr. Gogan was also president of the Northeastern Concrete Pipe Association.

CLARENCE CHARLES HALL, president and founder of the Hydro-Forged Stone Corp., Cleveland, Ohio, died August 27 after an illness of six weeks. He was 67 years old. Mr. Hall had invented a process for making concrete block which his company was perfecting at the time of his death.

GEORGE C. MOJICA, a co-partner in the Mojica, Mojica and Mojica Cement Pipe Co., Bakersfield, Calif., died August 23 at the age of 36. A veteran of World War II, Mr. Mojica was born in San Fernando, Calif., in 1917 and moved to Bakersfield with his family a short time later.

KNOTT RANKIN, president of the Rockland-Rockport Lime Co., Inc., Rockland, Me., passed away suddenly on August 23. Mr. Knott was an active member of the National Agricultural Limestone Institute and was recently elected to the board of the directors of the N.A.L.I.

MARION O. LAND, president of the Pioneer Sand Co., St. Joseph, Mo., died August 27 while on a fishing trip. He was 73 years of age.

CHESTER ELLIS MOUDY, owner of the Moudy Gravel Co., Dallas, Texas, died August 15 after a long illness. He was 63 years of age.

BARRY O'LEARY, owner and operator of the Billings Sand and Gravel Co., Billings, Mont., died recently at the age of 62.

DENNIS O'BRIEN, a director of the Missouri Gravel Co., Moline, Ill., passed away August 28 at the age of 89.

OLIVER HAROLD LINDSTROM, a partner in the Pueblo Pre-Mix Concrete Co., Pueblo, Colo., died August 15.



You get "gravy"...

NOT JUST WATER, WITH AN EAGLE "Swintek" ON THE JOB!

A dredge pump can't do the impossible—it handles a given volume of water and a varying volume of solids. With a little help at the right spot (at the intake nozzle) a dredge pump will deliver a far greater amount of solids.

An Eagle "Swintek" Traveling Screen Chain Dredging Ladder cuts and rakes loose deposit material and practically "spoons" it to the nozzle—you get the "gravy"—"thick gravy"—not just water.

Furthermore, the traveling chain screens the nozzle—keeps out boulders and debris. The cutter bars chop through clay strata and undercuts banks. The 75' Eagle Light Duty "Swintek" of the Walt Keeler Co., Inc., Wichita, Kansas is shown below.

AN EAGLE "SWINTEK" QUICKLY RETURNS ITS COST. USERS HAVE REPORTED UP TO 400 PER CENT INCREASE IN PRODUCTION. GET THE FACTS. SEND FOR NEW CATALOG 83.

There's An EAGLE "Swintek" For Every Deposit Condition

- *Heavy* DUTY
- *Light* DUTY
- *Special Light* DUTY



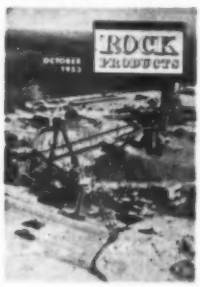
LEADERS IN AGGREGATE WASHING AND CLASSIFYING EQUIPMENT FOR HALF A CENTURY
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EAGLE IRON WORKS

industry news

Cover Picture

ON THIS MONTH'S COVER is an illustration of the Caudell and Johnson plant at San Diego, Calif. This plant is one of several in operation by this company in the San Diego area. The plant shown is located at the intersection of Texas and Friar roads, and it has a deposit which is said to have sufficient material to operate the plant at present capacity for 100 years. Approximately 4600 cu. yd. of material is handled daily. Four International TD-24 crawler tractors and rubber-tired scraper units are used for excavation and haulage to the scalping screen and primary crusher.



Cement Plant Expansion

OREGON PORTLAND CEMENT CO., Portland, Ore., has announced a $1,000,000 expansion program at its Lime, Ore., cement plant. The project will include modernization of the kiln-firing system and an increase in the stone conveying and crushing capacity. This and other planned expansions are expected to increase production capacity sufficiently to provide cement needed for the Snake River dams now under consideration, according to Frank E. McCaslin, president.

New Lime Plant

CHEMICAL LIME CO., recently incorporated with a capitalization of $500,000, is building a new plant at Baker, Ore., for the production of burned high-calcium pebble chemical lime. A 7¾- x 118-ft. rotary kiln is being installed. Two additional kilns of comparable capacity will be installed.

Opens Sand, Gravel and Stone Plants

PERMIAN SAND AND GRAVEL CO. has started operation of a crushed limestone plant at Notrees, Texas, and a sand and gravel plant at Royalty, Texas. The two plants, together with the trucking facilities, represent an investment in excess of $250,000. About 35 to 40 products reportedly will be produced, including concrete aggregates, roofing materials, masonry sands, sands for blasting and many other by-products. The crushed limestone plant is said to be the only one of its type in the state, west of Brownwood. Capacity is approximately 135 cu. yd. of crushed stone per hr. Capacity of the sand and gravel plant is 65 cu. yd. per hr. Owners of the company are Weaver Cunningham, Odessa, Texas, and E. G. Morrison and George Marsh of Austin, Texas. Associated with the owners are Guy Stroud as manager and G. T. Carlisle as salesman. Mr. Cunningham is also president of West Texas Concrete Co., Odessa, Texas.

Limestone Plant

A $12,000,000 LIMESTONE PLANT, which will be owned jointly by five steel companies, Republic, Great Lakes, Jones and Laughlin, Youngstown Sheet & Tube, and Bethlehem, is being built in southeastern Presque Isle County, Mich., along Lake Huron. Approximately 8,000,000 tons of limestone will be produced per year for use by the steel companies at their various plants. The Kelley Island Lime and Transport Co., Cleveland, Ohio, will operate the quarry and plant on a fee basis.

Expands Operations

RION CRUSH STONE CORP., Rion, S. C., has expanded its operations with the addition of a new plant to produce "Ri-Stone" poultry grit.

Opens Quarry

MISSOURI VALLEY LIMESTONE CO. has opened a rock quarry north of Griswold, Ia., on the H. Evans farm.

Exhibits Miniature Cement Plant

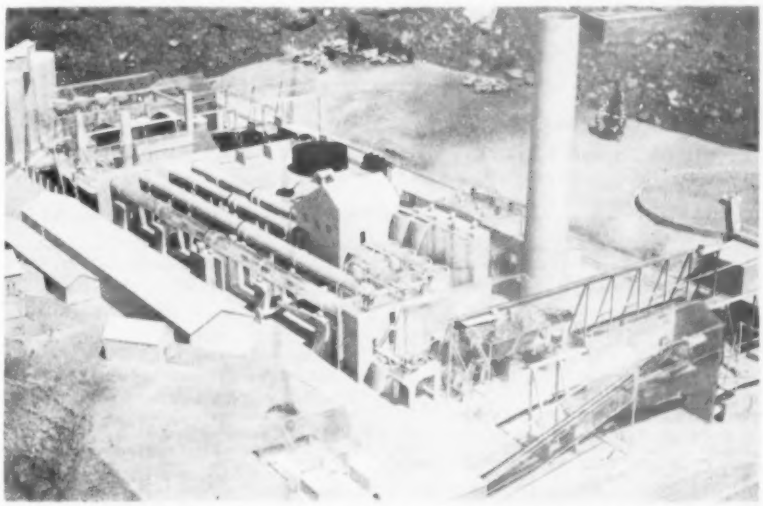
CALAVERAS CEMENT CO., San Francisco, Calif., recently built a miniature cement manufacturing plant, complete in every detail, to give the public a better understanding of how portland cement is made.

Built on a scale of ⅛ in. to the ft., the 10- x 18-ft. working model is a reproduction of the company's modern 4-kiln plant at San Andreas, Calif. It was previewed in September by nearly 400,000 visitors to the 1953 California State Fair, where it was a highlight of Calaveras County's first-prize display.

Major pieces of machinery are shown in motion at the actual speeds at which they operate at the plant, and many of them are made of lucite so that viewers can see what goes on inside. To give authenticity to the model, raw materials were taken from every point of the production line at San Andreas, and ground to scale for placement in the model at the corresponding points.

The exhibit required 1200 manhours to complete. It is powered by eight electric motors, each geared to do a specific job. Every moving unit is operated by independent chain drive, and eccentric motions are accurately reproduced with the help of specially contrived springs.

In anticipation of the public's questions, most of whom were viewing a cement plant for the first time, a continuously playing record explained the plant operations.



Working model of Calaveras Cement Co.'s 4-kiln plant at San Andreas was previewed at the 1953 California State Fair. Major units of machinery move at the speeds of their counterparts in the San Andreas plant

Consumption of Agricultural Liming Materials

THE NATIONAL LIME ASSOCIATION recently announced the results of its 24th annual survey, listing the approximate consumption of liming materials on United States farms during 1952. Robert S. Boynton, general manager, N.L.A., in releasing the report, gave the following comparisons:

"The total nation-wide consumption of liming materials for 1952, of 26,415,100 tons, showed very little change from 1951 and 1950. Actually, there was a slight loss of 170,000 tons (0.6 percent) from 1951. A severe drought in the southern states adversely affected lime consumption.

"Sectionally, minute decreases were experienced in the Northeast and East Central areas with the greatest decline in the South, 12 percent. The North Central section enjoyed a slight increase, while the West gained the most, 8 percent. One noteworthy change is that Iowa replaced Illinois as the greatest lime-consuming state. Previously, Illinois had led for the past 17 consecutive years.

"The greatest percentage gain occurred in Nebraska, a new lime-consuming state, of 116 percent. Ohio had the greatest tonnage increase of about 500,000 tons. Florida reversed the downward trend in the South by increasing its tonnage by 34 percent. Other increases occurred in Iowa, Michigan, Minnesota, Missouri, Maryland, Connecticut and Delaware.

"On the minus side, Oklahoma had the biggest percentage decline, of 31 percent, and Illinois the largest tonnage decrease of 700,000 tons."

Previous to the N.L.A. report, the National Agricultural Limestone Institute had released a summary of agricultural limestone consumption, as based on reports submitted by Directors of Extension, P.M.A. officials and members of the agricultural limestone industry. This report listed 1952 consumption as 27,252,045 tons, compared with 27,583,018 tons for 1951.

Liming materials consumption in 1952, as reported in the N.L.A. survey, was as follows:

State (1)	Agricultural Limestone (2) (Tons)	Burned Lime (Tons)	Hydrated Lime (Tons)	Marl (Tons)	Miscellaneous Materials (3) (Tons)	Total Liming Materials (Tons)	Lime Oxides (4) (Tons)
Maine	51,500	——	3,500	——	——	55,000	28,200
New Hampshire	30,200	——	200	——	——	30,400	15,240
Vermont	68,600	500	500	100	——	69,700	35,130
Massachusetts	52,000	——	3,000	——	——	55,000	28,100
Rhode Island	9,300	——	700	——	——	10,000	5,140
Connecticut	59,000	——	1,000	——	——	60,000	30,200
New York	813,000	——	17,000	20,000	——	850,000	426,400
New Jersey	134,500	2,000	24,000	——	1,500	162,000	86,410
Pennsylvania	1,105,000	31,000	61,000	8,000	7,000	1,212,000	628,480
NORTHEAST	2,323,100	33,500	110,900	28,100	8,500	2,504,100	1,283,300
Delaware	65,000	7,500	3,500	——	1,000	77,000	41,950
Maryland	208,000	51,000	22,000	30,000	10,000	321,000	180,280
West Virginia	174,000	8,000	4,000	23,000	11,000	220,000	110,440
Virginia	741,500	16,000	7,000	73,500	15,000	853,000	425,130
North Carolina	435,000	——	——	5,000	——	440,000	219,500
Kentucky	985,000	——	——	18,000	6,000	1,009,000	501,200
Tennessee	595,000	5,000	5,000	——	25,000	630,000	315,400
EAST CENTRAL	3,203,500	87,500	41,500	149,500	68,000	3,550,000	1,793,900
Ohio	2,555,000	2,000	28,000	4,000	57,000	2,646,000	1,323,060
Indiana	2,346,000	6,000	1,000	123,000	1,000	2,477,000	1,222,430
Michigan	430,000	——	——	220,000	25,000	675,000	302,000
Illinois	3,100,000	——	——	——	——	3,100,000	1,550,000
Wisconsin	1,787,000	——	6,000	12,000	20,000	1,825,000	909,900
Minnesota	436,000	——	——	4,000	——	440,000	219,400
Iowa	3,250,000	——	——	——	——	3,250,000	1,625,000
Missouri	2,635,000	——	——	——	195,000	2,830,000	1,395,500
NORTH CENTRAL	16,539,000	8,000	35,000	363,000	298,000	17,243,000	8,547,290
South Carolina	127,000	——	——	——	——	127,000	63,500
Georgia	324,000	1,000	——	——	7,000	332,000	165,680
Florida	413,000	——	500	——	5,000	418,500	208,850
Alabama	142,000	——	——	——	16,000	158,000	77,400
Mississippi	140,000	——	——	——	158,000	298,000	133,200
Louisiana	90,000	——	——	——	19,000	109,000	52,600
Arkansas	235,000	——	——	——	——	235,000	117,500
Oklahoma	250,000	——	——	——	——	250,000	125,000
Texas	103,000	——	——	——	——	103,000	51,500
SOUTHERN	1,824,000	1,000	500	——	205,000	2,030,500	995,230
Kansas	840,000	——	——	——	——	840,000	420,000
Nebraska	102,000	——	——	——	6,000	108,000	53,400
Wyoming	——	——	——	——	4,000	4,000	1,600
Washington	35,000	——	——	——	——	35,000	17,500
Oregon	70,000	——	1,000	——	5,000	76,000	37,700
California	12,000	——	12,500	——	——	24,500	14,750
WESTERN	1,059,000	——	13,500	——	15,000	1,087,500	544,950
GRAND TOTALS	24,948,600	130,000	201,400	540,600	594,500	26,415,100	13,164,670

(1) States not listed use little or no liming materials. Sources of statistics shown: (a) Production & Marketing Adm., U.S.D.A.; (b) Agricultural Experiment Stations; (c) State Extension Services; (d) State Departments of Agriculture; (e) County Agent Surveys; (f) Producers Surveys; (g) Farm Census.

(2) Includes all ground and pulverized forms of limestone (screenings, coarse and fine types) which are used for direct application to the soil.

(3) Consists of ground mollusk and egg shells, paper and sugar mill refuse, slag, lead mine chats, water softening sludge, and carbide refuse.

(4) Computed as: 50% for agricultural limestone; 88% for burned lime; 70% for hydrated lime; 40% for commercial marl and miscellaneous materials; 35% for farm-dug marl.

Sand and Gravel Plant

ROSENWINKLE SAND AND GRAVEL, recently organized by E. W. Rosenwinkle & Sons, highway contracting firm of Fairmont, Minn., has established a sand and gravel plant in Carver County, near Chaska, Minn. Crushing operations are handled by a portable crusher and a ½-cu. yd. shovel is used to feed the material to the plant. Crushed and screened material is hauled by truck to the washing plant, which is equipped with a 3-deck screen, twin sand screw dewatering unit and three stockpiling conveyors. A centrifugal pump is used for pumping water from a nearby lake to the plant.

Gypsum Expansion

BLUE DIAMOND CORP., Los Angeles, Calif., is currently expanding its mining and gypsum-products plant facilities at Blue Diamond, Nev., to increase production from 900 to 1300 tons per day. Cost of the expansion is estimated at $2,000,000.

Bulk Shipping Car

THE "AIRSLIDE" RAILROAD CAR, designed especially for bulk shipping of dry, powdered or granular commodities, is gaining an increasing interest among shippers and railroad executives, according to General American Transportation Corp., Chicago, Ill., which, in collaboration with the Fuller Co. of Catasauqua, Penn., designed and built this new-type, covered hopper car. The car was previewed recently at the Materials Handling and A.A.R. conventions, and also at a public showing in Chicago. It is now being exhibited on a nation-wide tour of most of the major U.S. cities for inspection by shippers and railroad executives, as well as the general public.



Cutaway view of covered hopper car designed for bulk shipping of dry, powdered or granular commodities

The "Airslide" car, which can be built to handle either high or low density materials, is loaded by gravity and unloaded in any of three ways: (1) by gravity feed into hoppers below the track; (2) through utilization of any mechanical conveyor system; or (3) through any pneumatic conveyor system—vacuum or pressure.

Pavement Yardage

AWARDS OF CONCRETE PAVEMENT for the month of August and for the first eight months of 1953 are listed by the Portland Cement Association as follows:

	Sq. yd. awarded During August 1953	During first eight months 1953
Roads	3,797,582	28,489,377
Streets and alleys	2,956,145	19,166,742
Airports	1,055,983	7,768,299
Totals	7,809,710	55,424,418

Employe Service Records

NEW YORK TRAP ROCK CORP., New York, N.Y., recently announced that its "40-Year Club" now numbers 21 members who represent a combined record of continuous service of more than 1000 years. The announcement was made by Floyd J. Buffington, vice-president in charge of operations, at the company's eighth annual clambake. A special presentation ceremony was held in honor of three employes who have joined the club during the past year. It was also noted that of the company's total production employes, 10 percent have been with the company more than 30 years and 43 percent more than ten years. The latter figure compares with a national average for the manufacturing industry of less than 10 percent.

Gravel Plant Sold

ARKADELPHIA SAND AND GRAVEL CO., Arkadelphia, Ark., formerly owned by the late M. B. Coate, has been sold to Clark County Lumber Co., owned by Ralph Williams of Arkadelphia and George Peck of Hope, Ark.

Expanded Shale Plant

RESCOLITE CO. has started production of an expanded shale aggregate at its new plant at Fort Smith, Ark. Production is estimated at 50,000 cu. yd. of finished aggregate per year. Officers of the company include Raymond F. Orr, president; George Junkin, vice-president and general manager; and Charles W. Alverson, sales engineer and technical advisor.

Moves Talc Plant

SIERRA TALC AND CLAY CO. has moved its operating plant from Los Angeles to Olancha, Calif., only seven miles from the talc and clay mine it will serve. Included in the move were dust collectors, mixing equipment and other mill machinery. Decision to relocate the plant came after the company sold its Los Angeles property to the state to be included in a new freeway to Long Beach.

Opens Crushing Plant

DEERFIELD BEACH ROCK CORP., recently incorporated by R. H. Wright and son, and B. F. Snyder, has started operation of a quarry and crushing plant near Deerfield Beach, Fla. The corporation also owns Hallendale Rock Corp., Hallendale, Fla.

Coming Conventions

October 19-23, 1953—
National Safety Congress and Exposition, Conrad Hilton, Congress, Morrison and Hamilton Hotels, Chicago, Ill.

October 19-23, 1953—
American Society of Civil Engineers, Annual Meeting, Statler Hotel, New York, N.Y.

October 21-23, 1953—
National Industrial Sand Association, Semi-Annual Meeting, The Greenbrier, White Sulphur Springs, W. Va.

October 29-30, 1953—
American Concrete Institute, Southwest Regional Meeting, Rice Hotel, Houston, Texas

November 12-14, 1953—
Southeastern Concrete Pipe Association, Annual Meeting, Williamsburg Lodge, Williamsburg, Va.

November 15-17, 1953—
Southeastern Concrete Masonry Association, Annual Meeting, Ft. Sumter Hotel, Charleston, S. C.

February 8-11, 1954—
National Concrete Masonry Association, 34th Annual Convention, Shoreham Hotel, Washington, D. C.

February 14-18, 1954—
American Institute of Mining & Metallurgical Engineers, Annual Meeting, New York, N.Y.

February 15-19, 1954—
National Ready Mixed Concrete Association, 24th Convention and Exposition, Conrad Hilton Hotel, Chicago, Ill.

February 15-19, 1954—
National Sand and Gravel Association, 38th Convention and Exposition, Conrad Hilton Hotel, Chicago, Ill.

February 18, 1954—
National Agricultural Limestone Institute, Board of Directors Meeting, Blackstone Hotel, Chicago, Ill.

February 19-20, 1954—
National Agricultural Limestone Institute, Annual Convention, Blackstone Hotel, Chicago, Ill.

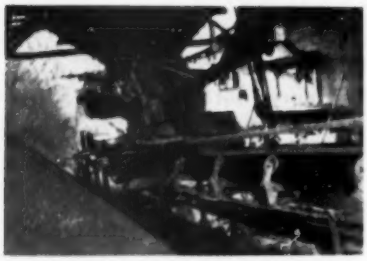
February 22-24, 1954—
National Crushed Stone Association, 37th Annual Convention and Manufacturers Division Exposition, Conrad Hilton Hotel, Chicago, Ill.

HH

Handling Clay-Bearing Gravel

AT A ROCK PRODUCTS OPERATION recently visited, sand and gravel was being excavated from below water by means of a dragline. As clay lenses were in the deposit, the practice of





Top: Control door for the feeder is a gate, hinged at the top; heavy boom with sheave (foreground), attached to gate, controls reciprocating motion. Bottom: Feed hopper in relation to conveyor and other equipment

soaking the material in transit and up to the processing screen was used to help solve the clay problem. The dragline loads to bottom dump trucks and the material, being wet, has a soak-time enroute. The truck unloads to a large hopper in which water jets can be used to help flush the material to the No. 1 belt serving the plant. The reciprocating-type feeder has several novel features. The control door for the feeder is a gate hinged at the top to which is attached a long, heavy boom with a sheave at the outer end. A wire rope extends up to the operating platform where the trucks dump. The operator, without leaving his post, can raise or lower the hinged door so as to feed the desired amount. If the material is sticky, the door can be opened wide and water flushes the material to the belt. Excess water drains off the tail end of the belt to a waste ditch.

Another feature of the feeder is its use of side boards, the width of which can be easily varied to suit the types and amounts of material being handled. These guide boards are hinged at the feeder end and, for several feet, the assembly is provided with old belting for added height and other obvious advantages A long arm, equipped with a locking device at the outer end, has been provided to each of the two guide boards, so once the two guides have been set they cannot shift easily. The operator can vary the width of the pile of material on the off-bearing belt to suit conditions, dry or wet.

Applications of Ultra-Violet Light

THE ULTRA-VIOLET LIGHT is a valuable instrument with many uses. Some minerals fluoresce or glow when its rays are applied to the mineral's surface. Opalite, the reactive aggregate, is one, in addition to ilmenite, zircon and many others. The lights are relatively inexpensive. The unit shown in the illustration, manufactured by Ultra Violet Products, Inc., and designated Model B-50-H, is a long-wave, all-purpose, inspection light, capable of throwing a directional beam up to 30 ft. The wave length is 3660 A.U. Radiations are harmless to the eyes and skin.

One noteworthy use of this type of unit is to detect cracks in machined or rough castings. The surface of the



Ultra-violet inspection light can be used to detect cracks in machined or rough castings

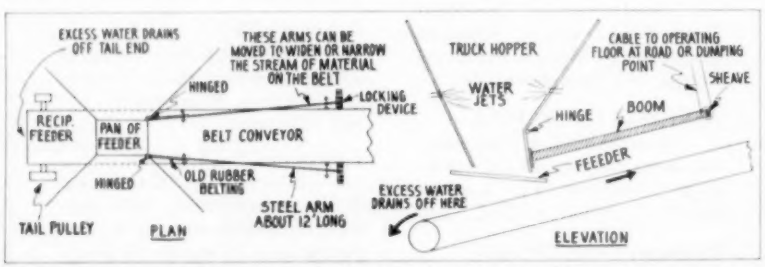
specimen is wiped with an oil-soaked rag and then wiped clean. Under the fluorescent light (preferably in a darkened room) the oil in the crack will glow a bright yellow. Fine hair cracks which might otherwise be overlooked can be exposed. If it should be impractical to use a thin oil for determination of flaws, there are many invisible inks, powders and dyes available on the market.

Protecting Electric Conduits

THE ILLUSTRATION shows a conventional belt conveyor delivering crushed limestone from a relatively new quarry in Indiana. The primary crush-



Pipe line, paralleling conveyor, encases all conduits to protect electrical wiring from flying fragments of rock



Left: General plan of feed-hopper installation. Guide boards are provided with long arms with locking device; arms are moved to widen or narrow stream of material on belt. Right: Vertical view shows details of arrangement. Operator controls feed by raising or lowering hinged gate; water jets flush material to conveyor belt, with excess water draining off to waste ditch

er is near the quarry floor. The interesting feature of this picture is not the conveyor but the pipe line that parallels it, for all conduits in this operation are encased in steel pipe so that flying fragments of rock from blasting, or other causes, cannot easily damage the electrical wiring. On level areas, where trucks could operate, all conduits are similarly encased in steel pipe and, in addition, are buried in the ground at sufficient depths that traffic cannot damage them.

Ball Mill Set-Up

A WESTERN CEMENT PLANT has two 9- x 26-ft. Marcy ball mills. The mill and liner without ball charge weigh 138½ tons. The mill carries 80 tons of balls, or a total load of 218½ tons on the two trunnion bearings. To elim-



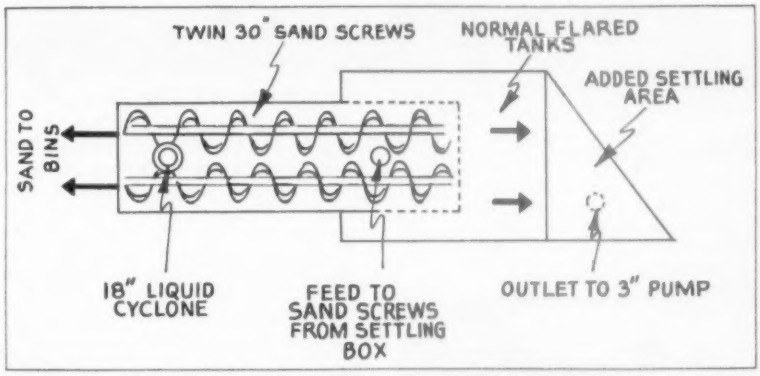
Chute at discharge end of ball mill provides for addition of make-up balls

inate starting troubles, a hand-operated oil pump was installed so that lubricating oil could be pumped under the bearings. The unit is powered by a 1250-hp. synchronous motor that starts like a slip-ring motor. No clutch is used. It starts across the line yet reportedly does not draw as much starting power as a conventional 600-hp. synchronous motor. The chute in the trunnion (see illustration) shows how make-up balls are added to the mill with a grid on the discharge end. Leaded bronze bearings are used and are said to eliminate the tendency to grab when hot.

Sand Recovery

AN EFFECTIVE ARRANGEMENT is used by a Southwestern sand and gravel producer to recover fine sand. As indicated in the illustration, the twin Eagle screws have a flared overflow to which has been added a triangular-shaped end box to provide more settling area. This triangular area is the width of the flared tank and about 4 ft. long on its other leg.

Any sand which settles in this section is picked up by a 3-in. centrifugal pump and the pulp is delivered to an 18-in. dia. Whirlcone liquid cyclone mounted above the sand



Plan view of twin sand screws and liquid cyclone assembly for recovery of fine sands

screws at a point near the sand discharge end. The liquid cyclone recovers additional minus 100-mesh sand which is mixed in the sand screws with current production.

Sand Stockpiling

A SAND AND GRAVEL OPERATOR in Minnesota has devised a simple meth-



Sand is delivered by belt conveyor to truck-loading bin; excess material overflows automatically to ground-storage belt

od of maintaining a full truck-loading bin. The bin is of relatively small capacity and any excess sand is ground-stored. Sand is delivered to the truck bin by means of a belt conveyor. A second belt conveyor, set at the proper elevation and to one side of the center line, has its toe-end resting on top of the bin. The second conveyor is so mounted that, when the bin is full of sand, any excess from the plant automatically overflows onto the second belt and is delivered to the stockpile. No flip-gates are involved, nor an attendant required.

Push-Button Controlled Radial Stacker

THE SURGE PILE INSTALLATION shown in the accompanying illustration is in use at a Texas sand and gravel plant. The set-up is different from most conventional installations in that the stacker is a radial unit and builds a pile that describes an arc of relatively large radius. The entire assembly is push-button controlled so that the plant operator can shift the discharge point of the stacker belt. The belt is 36 in. Boston Woven Hose, riding on Stearns idlers and the unit is 120 ft. long. The arc is 60 ft. long. The assembly handles 400-500 t.p.h. of pit-run sand and gravel. The radius of the arc does not prevent the use of a straight-in-line reclaiming belt that operates in a tunnel under the arc-shaped pile.



Radial stacker over surge pile describes 60-ft. arc

NEW Machinery

Hydraulic Loader

LESSMANN MANUFACTURING CO., Des Moines, Ia., has announced improvements on the three models of its hydraulic power-crowd loader. The



Hydraulic power-crowd loader has a forward thrust of 15,000 lb. standing still

power-crowding feature exerts a forward thrust of 15,000 lb. while the unit is standing still, thus permitting shovel loading of frozen sand and aggregate and digging in hard or compacted soils. The loader has a variety of buckets, capacities ranging from ⅝ to 1¼ cu. yd., which are interchangeable on the unit by means of four steel pins. The unit will dig 12 in. below wheel level. It has been designed to load in the front end of trucks with high bodies when the truck is approached from the rear. Bendix Hydro-Vac brakes, Vickers power-steering and an all-weather cab are optional equipment.

Conveyor Belt Guide

KNAPP MILLS INC., 23-17 Borden Ave., Long Island City 1, N.Y., recently acquired the patent rights for the Guidler, a conveyor belt guide which helps protect the belt edges from ripping and tearing under heavy use. It is designed to return the belt to its proper course without injury

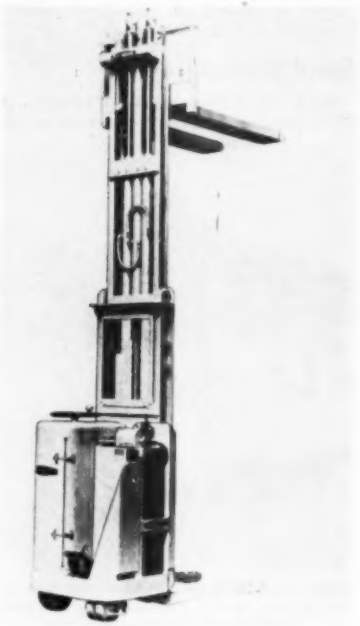


Guide protects edges of conveyor belts

and to control it within narrow distances of movement. When installed at a 30-deg. angle, the guide provides a revolving hyperbolic face to the belt edge, distributing impact forces over a relatively long flat surface, instead of at a single striking point. It moves along the axis and follows the vertical movement of the belt edge and controls it while arising.

Fork Truck

THE RAYMOND CORP., 213102 Madison St., Greene, N.Y., has released a 2000-lb. capacity telescopic fork

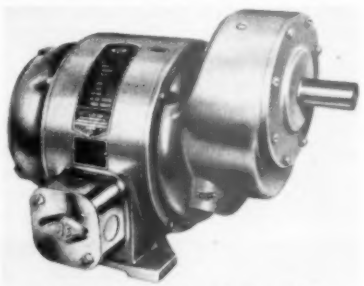


Electric telescopic fork truck

truck, as an addition to its line of electric trucks. Specially designed for handling single faced pallets and skid platforms, the truck has an elevated fork height of 132 in., a collapsed height of 83¾ in., base forks and elevating forks of 30 x 42 in., and dual tandem load wheels.

Speed Reducer

REULAND ELECTRIC CO., Alhambra, Calif., has brought out the offset-shaft Motoreducer, a single reduction unit which converts conventional high speed into a low-speed, high-torque output in one step. By rotating the endbell, the output shaft can be connected to the load either above, below, right or left of the drive motor, thus eliminating mounting platforms and assuring true, in-line hookups. Mechanical features include oil bath gear lubrication, the use of helical gears, and the transmisison of lateral load stresses directly to the motor's mounting base by locating the gear train immediately adjacent to the vertical



Offset-shaft, single reduction unit

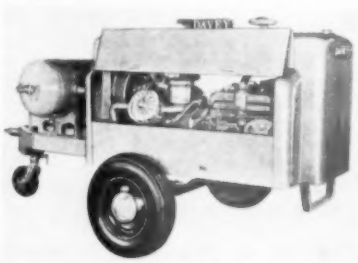
centerline of the base. The unit is available in hp. ratings from ½ through 5 hp. and in output speeds from 190 through 520 r.p.m. Additional versatility is provided through the use of fluid-shaft, slip-ring, squirrel cage and multi-speed motors, which are available with either one or two through-shaft magnetic brakes located at any point on the output or input shafts.

Conveyor Belt Capping

UNITED STATES RUBBER CO., Mechanical Goods Div., Rockefeller Center, New York 20, N. Y., is adding a tough rubber capping of special construction along the edges of conveyor or belts used on underground equipment to guard against excessive wear of the belt edges.

Compressor

DAVEY COMPRESSOR CO., Kent, Ohio, announced production of a 210 c.f.m., two-wheel trailer compressor. The unit, designated Super Chief Model 210-WDS, is equipped with multi-port valves, which are said to increase the amount of air delivered per lb. of fuel by 15 to 25 percent. The engine is a 6-cylinder Hercules with a power surplus of approximately 25 percent. The 145- x 62- x 75-in. unit weighs 3400 lb.



Trailer compressor of 210 c.f.m. capacity

Hydraulic Power Shovel

BRADY MANUFACTURING CORP., S.E. 30th & Granger, Des Moines, Iowa, has arranged to manufacture a detachable version of the Lessmann power shovel under Lessmann patents. The detachable unit has been named the Lessmann Jr. and is ready for



Tractor-mounted shovel with hydraulic crowder arms

mounting on Ford and Ferguson tractors. The shovel employs hydraulic crowder rams for ramming to load the bucket. After being loaded and raised to the proper height, the arms are retracted to throw the load on the rear wheels to reduce strain and allow easier steering and maneuverability. The shovel may be used for digging, scraping, loading and lifting while the tractor stands still. It will dig 12 in. below wheel level and unload at heights to 10 ft. A backfill blade is available as optional equipment.

Tractor Overdrive

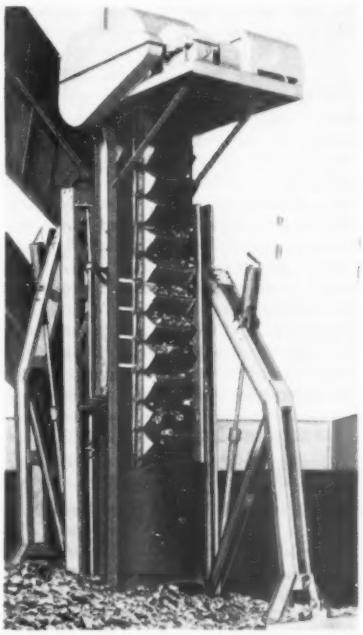
CATERPILLAR TRACTOR CO., Peoria 8, Ill., has developed an overdrive, as an attachment on the new DW20 four-wheel tractors or for installation on units now operating in the field. When used on tractors with 15.75 to 1 final drive reduction, the maximum speed is 34 m.p.h., and with tractors of 21 to 1 final drive reduction, it provides a top speed of 25 m.p.h. When combined with the present standard transmission, the overdrive provides a range of ten speeds forward and two in reverse. The unit is mounted between the engine and transmission and is controlled by a manually-operated shift lever next to the regular gear-shift lever. Installation requires a special transmission front cover, a clutch shaft and a universal joint, supplied as part of a package available for field installations.



Tractor equipped with overdrive attachment, utilizing extra shift lever

Bulk Material Handler

CARGO HANDLERS, INC. 23501 Hoover Rd., Van Dyke, Mich., has brought out the "Cargo Handler," a patented machine for automatic handling of bulk materials. Loading and unloading operations may be handled either

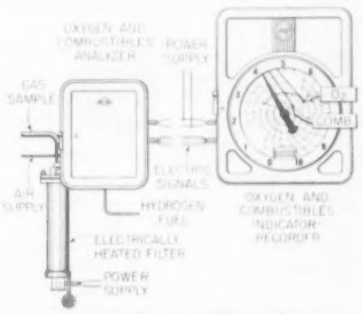


Automatic self-feeding elevator for bulk material loading or unloading

manually or automatically by usually only one man, and a smooth continuous flow at full equipment capacity is said to be effected. The unit usually consists of an automatic feeding mechanism built integral with an elevator or conveyor to feed a system of conveyors for distributing or stockpiling material, or it may be used as a ship unloader, being hinged to and suspended from a pantograph system of parallel counter-weighted beams, which are mounted on a traveling tower, gantry or bridge. In this sort of operation, it may be revolved about its vertical axis on a turntable to permit operating at various angles in the hold. It may be mounted on a tractor, steel rails, on a dock, platform or ship's deck. When consisting of an automatic self-feeding elevator, the handler may be suspended from a boom, bridge, crane, gantry or similar device and upon being lowered into a barge or ship's hold, will automatically unload the material. This automatic self-feeding mechanism consists of scrapers, built integral with the elevator and operated by automatically controlled hydraulic power units.

Combustibles Analyzer

BAILEY METER CO., 1050 Ivanhoe Rd., Cleveland 10, Ohio, has introduced a combination oxygen and combustibles analyzer with an indicator-recorder for automatically controlling



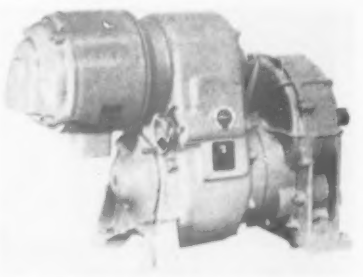
Oxygen and combustibles analyzer

the necessary adjustments required to maintain combustion efficiency within the equipment limitations. An analysis of excess air and fuel-air mixing performance is given by this single unit.

Variable Speed Drive

STERLING ELECTRIC MOTORS, INC., 5401 Anaheim-Telegraph Road, Los Angeles 22, Calif., has started production of the KFEB double-reduction 20- and 25-hp. Speed-Trols with speed variation of 2:1, 3:1, and 4:1. Maximum speeds of the 20-hp. type 364 and the 25-hp. type 365, range from 176 to 42 r.p.m. and 176 to 64 r.p.m., respectively. Efficient power transmission and accurate maintenance of any selected speed are accomplished by means of adjustable variable pitch pulleys. Drip-proof and splash-proof models feature direct-through ventilation.

In the totally enclosed, fan-cooled model, a dual cooling system for internal and external cooling is provided, the air inside the motor circulated by means of a large diameter internal cooling fan through air passages between the motor housing and stator, over motor windings and through motor openings. Heat from the motor is dissipated by convection, conduction and radiation to the outside of the motor supplementing the cooling system.



Drive adjustable through integral, variable pitch pulleys

Open-Bowl Scraper

WOOLDRIDGE MANUFACTURING CO., Sunnyvale, Calif., has released Model OS-152, a tractor-drawn, open-bowl design scraper with capacities of 19.0



Open-bowl, tractor-drawn scraper

cu. yd. heaped, 15.2 cu. yd. struck. A low gravity center for stabilized balance in all positions, 25-in. ground clearance for increased maneuverability, and a wide 75-in. apron opening to allow unrestricted discharge of sticky materials are some of the scraper's features. A positive "roll-out" ejector is actuated by a pushing ram with a minimum power requirement. Large low-pressure tires, a wide pusher plate, tire cleaning guards, rugged formed steel construction and simple cable reeving are also included among the unit features.

Automatic Welding Head

MIR-O-COL ALLOY CO., 312 North Avenue 21, Los Angeles 31, Calif., has developed the Model 944 automatic welding head. An electro-mechanical control circuit stops the head and positioner automatically if the arc is broken or the electrode sticks to the work piece. When the arc is established, a control cuts off the high frequency unit. The motor drive is electrically independent of the positioner and welder power supply. The feed rolls on the head are of hardened steel and adjustable for both solid and tube wire, taking rod sizes from ⅛- to ¼-in. diameter. The gear train is ball-bearing equipped throughout with heavy-duty, double row bearings on the feed roll shaft. The control unit provides a manual "inching" control; welding voltage control which regulates deposit rate; travel control for complete manual control of positioner; and welding current control if the transformer is equipped for remote control. Welding voltage and current meters are provided. The unit will operate with any positioner or transformer, with a maximum current capacity of 2000 amps.

Welding Rod

RANKIN MANUFACTURING CO., 3072 W. Pico Blvd., Los Angeles 6, Calif., has announced a hard-surfacing welding rod, the "Ranite F," which is said to give wear results comparative to tungsten rods. For maximum wear resistance, the parent metal should be preheated and the deposit cooling rate retarded as much as job conditions permit. As the electrodes are abrasion-resistant, considerable checking may be encountered on certain applications. Generally, the checks are harmless, as they are at right angles to the bond and serve to relieve stresses in the overlay; however, if difficulty is encountered on highly heat-treated steels, they may be annealed before facing or faced in unheat-treated condition.

Industrial Locomotive

GENERAL ELECTRIC CO., Schenectady 5, N.Y., has added a 35-ton, twin-axle, diesel-electric locomotive to its line of industrial switches. The Cummins diesel engine is nominally rated at 275 hp. at 2100 r.p.m., and is directly connected to a shunt-wound d-c generator equipped with a winding to permit it to be used for starting the engine by storage-battery power. Starting tractive effort is 21,000 lb. at 30 percent adhesion. Speed is controlled by a throttle lever, which regulates the diesel-engine output and is also interlocked with the electrical control to provide a maximum speed of 20 m.p.h. Air-brake equipment applies one shoe to each wheel, while a hand brake of the ratchet and drop-lever type is also provided. The standard locomotive weight is 35 tons, although it can be ballasted to 40 tons.



Twin-axle, diesel-electric locomotive may be started by storage battery

Conveyor Controls

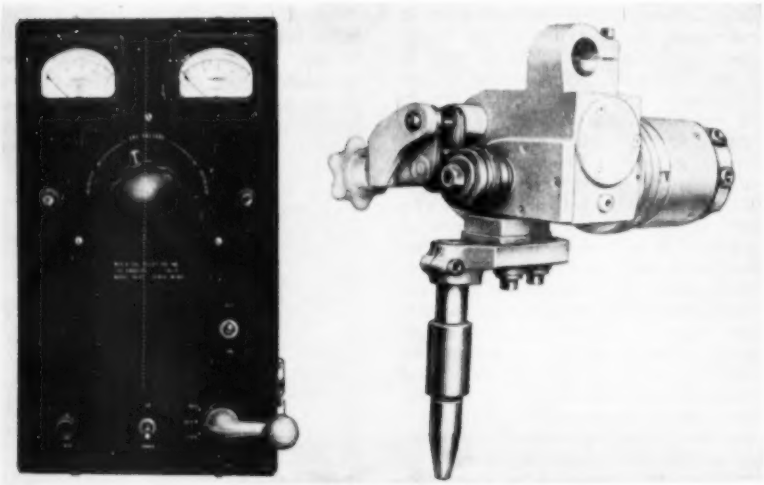
JOHNSON-MARCH CORP., 1726 Chestnut, Philadelphia, Penn., has made available two conveyor-activated, switch controls to regulate production operation automatically. The controls are adaptable to any materials-handling system for activating signal lights, auxiliary conveyors, or other controls. One device, Model UB, is designed especially for belts conveying coarse, abrasive or lump material. It is mounted beneath the belt on a spring-loaded shaft which exerts light tension on the shaft arm and the master wheel rolling against the belt. The shafts and brackets fit standard size conveyors from 16 to 48 in. wide, while shafts for wider conveyors can be supplied.

The other control device, Model 4A, is designed primarily for fine, light-weight material handling, or for use on chutes, pan and roller conveyors. It is installed over the conveyor belt and opens and closes the switch control by means of a paddle arm. This control is available complete with pipe and brackets to fit any size conveyor belt.

Both devices may be used in mines, quarries, industrial plants, etc. using solenoid valves, conveyor over-loading signals and remote control operations. The controls also may be used to start and stop primary and secondary conveyors automatically.

Conveyor Belt Idlers

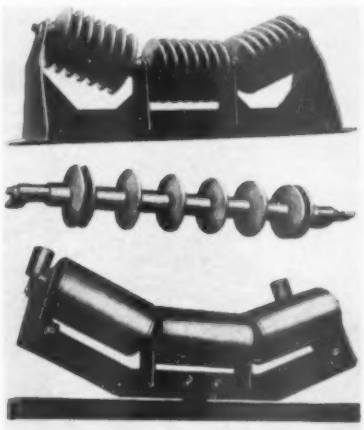
TRANSALL INC., P. O. Box 1588, 158 N. 11th St., Birmingham, Ala., has brought out "Tran-Seal" heavy-duty belt conveyor idlers. Molded bearing cavity closures on both sides of each bearing provide protection against abrasives and moisture, and the heavy-duty precision type bearings are permanently sealed and packed with a high-quality synthetic lubricant. An improved method of bearing mounting is said to eliminate any possibility of axial pre-loading in the assembly.



Control unit and automatic welding head

Conveyor Belt Idlers

PIONEER ENGINEERING WORKS, INC., 1515 Central Ave., Minneapolis, Minn., has announced three idlers, an impact, self-cleaning return, and self-aligning troughing idler. The impact

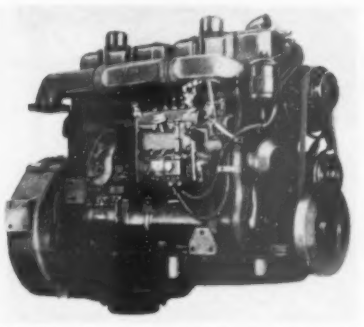


Top to bottom: Impact idler, self-cleaning return idler and self-aligning troughing idler

idler is equipped with rubber segments mounted side by side on a seamless tube to absorb the shock of falling material and thus prevent undue cutting and wear of the belt. The self-cleaning return idler is of single roll construction and is equipped with rubber roll segments, two of which are mounted side by side on each end of the roll. Additional segments are evenly spaced to permit the conveyor belt to travel freely without a build-up of material on the roller. The self-aligning troughing idler has two guide rollers, one mounted on each end of the set of troughing idlers. When the weight of the material is unbalanced, self-alignment is provided since the idlers swing freely to the left or right on a pivoted base. All the idlers are available for 24-, 30- and 36-in. conveyors.

Truck Diesel

MACK TRUCKS, INC., 350 Fifth Ave., New York 1, N.Y., announced a diesel engine, the Thermodyne Model END-673, for truck installation. It develops 170 brake hp. at 2100 r.p.m. with a torque output of 480 ft. lb. maximum at 1200 r.p.m. The combustion chamber design provides rapid and complete combustion and more efficient injection nozzle cooling. Standard electrical or optional air-starting equipment is available. The Synchrovance, which automatically advances or retards injection timing according to engine speed, also is incorporated. This feature is said to result in smooth-running and full power development. Features of the company's previous diesels, such as multiple injection pumps, water-cooled nozzles, variable-speed, hydraulic, centrifugal governors, etc., are also included in the unit. It is offered in the LJ, H, W and B-61 series of its truck and tractor models.



Diesel engine of 170 brake hp. has improved combustion chamber design

Screen Heater Insulation

F. R. HANNON & SONS, 1605 Waynesburg Rd., S. E., Canton 7, Ohio, has announced the use of composition glass insulation throughout its electric screen heating equipment. The insulation is said to absorb only 1/10 of 1 percent moisture, thus eliminating possible shorting. Other advantages claimed are fabrication ease, negligible abrasion and great tensile strength under extreme pressure or shock. The material is also available for insulation replacements on previous model heating equipment as needed.

Crushing-Screening Plant

PIONEER ENGINEERING WORKS, INC., 1515 Central Ave., Minneapolis 13, Minn., has added a duplex crushing and screening plant to its line of portable plants. The plant, Model 35-S, is a lightweight, in-line unit, primarily designed for use in gravel pits. The in-line feature means that the basic flow of material is in line, longitudinally, with the axis of the plant, the material being fed into the rear and discharged at the front end. The plant was designed particularly for use in areas where weight restrictions are severe and where frequent and fast moves are necessary, as it can be pulled in and out of a pit without dismantling or removal of conveyors or other accessories. The unit consists of a 1036 jaw crusher, a 3024 double-roll crusher, 2½ deck vibrator screen and the necessary conveyors. Included on the plant is a 30G (30 in.) mechanical feeder, or a 30-in. x 40-ft. super-heavy service swivel feed conveyor to the conveyor on the plant with a 30G feeder at the lower end. The 16-in. x 6-ft. channel frame sand reject conveyor is optional. The welded steel truck frame is mounted on a rear equalizer and a single front dolly with 12 pneumatic tires.

Power Take-Off and Torque Converter

TWIN DISC CLUTCH CO., Hydraulic Div., Rockford, Ill., has developed a disconnecting hydraulic power take-off and a two-stage hydraulic torque converter. The "Hud" power take-off is designed for industrial applications which require a quick, positive disconnect of power source from driven equipment. It incorporates a double-circuit coupling and is available with an integral cooling radiator, fan-drive and cooling-fan assembly. Disconnection is actuated from a master control valve, which operates differential pressure valves to dump oil within the take-off into a reservoir. The drum clutch can be engaged with engines idling; loads can be picked up simply by opening the throttles; and multiple engines can be synchronized while operating at slightly different speeds. Designed for limited space applications, the take-off is available in coupling sizes of 21 and 27 in., to handle up to 600 hp. engines.



Duplex crushing and screening plant for processing sand and gravel

REMOVING LIGNITE FROM SAND

Reclaim acceptable sand for Garrison dam by "slacking" lignite content in beds exposed to air and then processing in plant by washing and classifying

By WALTER B. LENHART

DURING THE SUMMER of 1951, ROCK PRODUCTS made a rather complete survey of the giant dams under construction on the Upper Missouri river by the Corps of Engineers, U.S. Army. At the time, superficial examination of the preliminary work going on at Gavin's Point and Oahe dams were included. Ft. Randall, Garrison and a few of the smaller dams on tributaries were included in the survey as well as inspection of the aggregate plants supplying both the coarse and the fine aggregates for all dams. At the time, Garrison dam was using sand shipped into the area from Detroit Lakes, Minn., at a cost of $3.44 per ton for freight alone. The coarse aggregate for Garrison dam is supplied by J. L. Shiely & Co. from its Greene, N. D., plant. The information accumulated on this extensive survey was published in the October and November, 1951, issues of ROCK PRODUCTS.

Garrison dam is being built above Bismarck, N. D. The town of Riverdale has been established at the site with ample facilities for the traveller. The dam site itself is in a series of low lying hills that are of sedimentary origin and, where dirt cuts have been made in the flanks of these hills, beds of lignite of considerable thickness are exposed. Lignite coal excavated from the dam site and from the afterbay facilities is used for developing steam-electric power at Riverdale. Vast resources of lignite, semi-bituminous and bituminous coal blanket the western half of North Dakota and the eastern half of Montana and extend down into northwestern South Dakota. One authority estimates that in the United States there are a total of 14,925 quadrillion (million billion) B.t.u.'s of total recoverable coal reserves. The area mentioned above contains 5950 million billion B.t.u.'s of this total. The future strength of the United States will lie in the direction of these vast coal resources. With the Missouri river cutting a swath through these lignite areas one can readily understand why the sand and gravel at the Garrison dam site would be high in that organic material.

In 1951 it was revealed that local sand in the vicinity of the Garrison dam was rejected because it was "reactive." The sand also contained lignite which was objectionable. After a year or more of construction, the high cost of shipping in sand led the Corps of Engineers to reconsider the local material. Before deciding to use the local sand—at a considerble saving to the taxpayer—a large amount of test work was conducted to determine the effect of lignite coal (not organics per se) on the ultimate strengths of the resulting concrete. These tests showed no loss in strength or durability as compared with other sands. During the winter 1952-1953, sand processing equipment was established at the construction site. Sand taken from the west bank of the Big Muddy

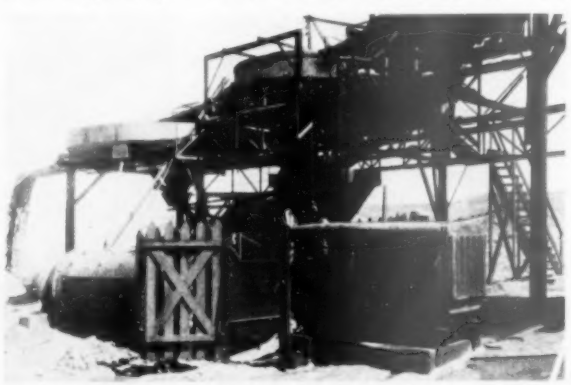


Large capacity truck hauling excess gravel from sand plant. Note classifiers to the left

is now being used for the concrete work on the spillway, stilling basin and second stage of the power house. This involves the use of 225,000 cu. yd. of sand for concrete and 60,000 cu. yd. of gravel will be processed here for drainage uses.

In traveling from the West Coast toward Garrison dam, the closer to the construction site the more fantastic became the reports on the sand job. One report was that "the concrete is black from the amount of lignite coal in the sand used." Another reported "the dam has so much lignite coal in it that they are afraid to have a fire around closeby for fear the





Left: A 20-ft. classifier above dewatering screws. Right: Diesel unit driving rod mill, and above may be seen the classifiers

structure will catch on fire." A third report was "the sand gives an A.S.T.M. color chart of No. 4."

On arriving at the dam site, it was soon found that the concrete was not black or even dark colored. There is no danger of fire as the sand now being used contains less than 0.1 percent of lignite and by referring to the tabulated concrete designs (concrete mixtures) there is less than 1 lb. of lignite coal per cu. yd. of concrete. This amount of lignite, however, (0.1 to 0.01 percent) does give an A.S.T.M. color chart reading of No. 4—which is a black color and by A.S.T.M. standards considerably subgrade. The chart referred to is the tannic acid test for organics in sand. While the sand is still considered slightly "reactive" it is being used with a low alkali portland cement (Type II) shipped in from the Duluth, Minn., plant of Universal Atlas.

However, to insure protection against unreasonable future maintenance, the Corps of Engineers decided to use sand of unquestioned character on those portions of the work that would be under water, or where repair costs would run high—in the event such repairs were necessary. Hence Minnesota sand was used on the power house foundations, the tunnel linings, up-stream control towers, and similar items. The sand containing lignite to be used on the spillway, stilling basin, the second stage of the power house, and places where, in the event of trouble in the years ahead, repair costs would not be out of line. At the time of inspection, a concrete mat was being poured at the downstream toe of the stilling basin. This mat is 18 in. thick and reinforced with 1-in. steel bars on 12-in. centers in both directions and in the same plane. In addition drill holes were put down to a depth of 14 ft. The 6-in. dia. hole reamed out to an 18-in. bell at the bottom and a 1¼-in. steel reinforcing rod was grouted into the hole with non-shrinking concrete (aluminum powder variety). This vertical reinforcing anchors the mat to the terrain. In drilling the 14-ft. holes a bed of lignite several feet thick was penetrated.



Sand and gravel processing plant. At the top is the scalper screen and to the right and below may be seen the three classifiers

Sand Processing System

When it was decided to process local sand, a sand processing system was decided on and adequate equipment was installed to do the job. G. C. McBride, Waco, Texas, and Robert Klossner supervised the erection and operation of the sand plant on an engineering service contract. Garrison Spillway Constructors is the prime contractor on the work indicated with J. Kellogg, project manager for the contractors. M. R. Smith is concrete technologist for the Corps of Engineers and R. E. Olsen, materials engineer for the Corps.

The ultimate success of the washing plant hinged somewhat on the fact that when sand containing lignite is stored above water, a slacking (or other) physical-chemical reaction takes place so that the lignite is washed out of the pit-run easier than would be the case of a non-aged, non-air-exposed sand. The process adopted lent itself to a storage system and involved as a first processing technique, a preliminary portable, dry, field-scalping plant, and the plus ⅜-in., minus 3-in., was rejected and returned to the pit. The plus 3-in. is waste. The minus ⅜-in. is later reprocessed for sand. The portable plant was built by Mr. Klossner who has had wide experience in that field for he is also chief engineer for the Texas Construction Materials Co., Houston, Texas. The rejected gravel contains a small amount of so-called "chocolate drops," or iron manganese concretions that cause staining, as well as a small amount of unsound particles that seem to slack on exposure to the air for a long period of time. However, the gravel is of such quality that it can be used for drainage purposes, or as a bedding material or mat under the rip-rap faces. As Garrison dam is essentially a dirt-fill dam, upstream erosion is prevented by use of rip-rap. Placing large masses of large rock on a dirt face is not enough, for wave action would result in flows through the interstices of the large pieces of rip-rap, and this downward flow of water under the rip-rap would cause dirt erosion. Therefore, a thick

TEST ON CONCRETE & GROUT

Poured by Garrison Spillway Constructors

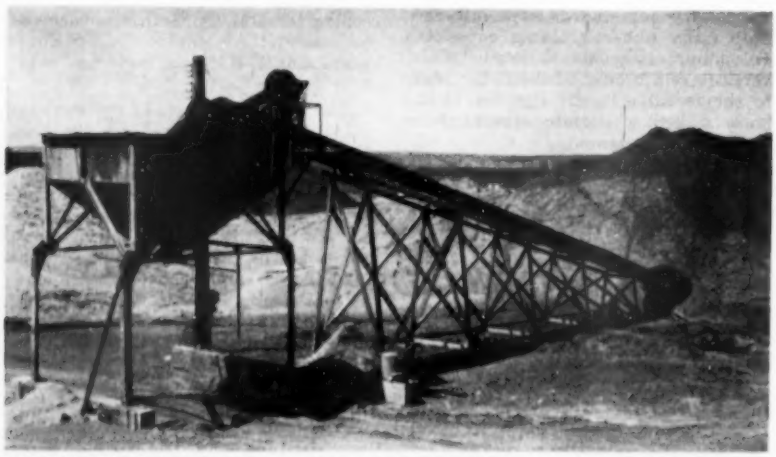
Grout Cubes (2 x 2 in.)

(for Paving Anchors)

Date made			Mix GA 13	
15 April	3 day	908 p.s.i.	cement	931 lb.
	7 day	1396 p.s.i.	sand	2099 lb.
	28 day	3325 p.s.i.	water	425 lb.
	90 day	4767 p.s.i.	alum powder	42.27 gms.
			protex	170 gms.
28 April	3 day	1008 p.s.i.		
	7 day	1975 p.s.i.		
	28 day	3742 p.s.i.		
	90 day	4933 p.s.i.		
	PAVING SLAB		B8₀ Mix 3 in.	
4 May B8₀	7 day	2830 p.s.i.	3 in.	4384 lb.
	29 day	4386 p.s.i.	cement	1580 lb.
	90 day	6420 p.s.i.		
5 May B8₀	7 day	1963 p.s.i.	1½	2996 lb.
	28 day	3944 p.s.i.	¾	2611 lb.
	90 day	5376 p.s.i.		
7 May B8₀	7 day	2423 p.s.i.	sand	3967 lb.
	28 day	4580 p.s.i.	water	534 lb.
	90 day	5482 p.s.i.		
8 May B8₀	7 day	2264 p.s.i.	protex	415 gms.
	28 day	4333 p.s.i.	(air designed to 5.3 percent on 1½ in. conc.)	
	90 day	5271 p.s.i.	B8₇ Mix	
15 May B8₇	7 day	1698 p.s.i.	3 in.	3960 lb.
	28 day	3749 p.s.i.	cement	1580 lb.
	90 day	4828 p.s.i.		
18 May B8₇	7 day	1963 p.s.i.	1½	2620 lb.
	28 day	4138 p.s.i.	⅜	3092 lb.
	90 day	5182 p.s.i.		
21 May B8₇	7 day	1645 p.s.i.	sand	4279 lb.
	28 day	3873 p.s.i.	water	537 lb.
	90 day	5696 p.s.i.		
22 May B8₇	7 day	2087 p.s.i.	protex	425 gms.
	28 day	4881 p.s.i.	(air designed to 5.3 percent on 1½ in. conc.)	
	90 day	5359 p.s.i.		
		1½-in. Concrete in Manhole		
Manhole E-4	7 day	2034 p.s.i.		
	28 day	4262 p.s.i.		
	90 day	5217 p.s.i.		
Manhole C-6	7 day	1892 p.s.i.		
	28 day	3537 p.s.i.		
	90 day	4687 p.s.i.		



Approximately 180,000 tons of sand high in lignite spread out in layers. A tractor equipped with dozer blade cuts vertical sections away to get an average blend of material for processing. Exposed to the air the lignite "slacks" and is more easily removed in the washing, screening and classifying operations



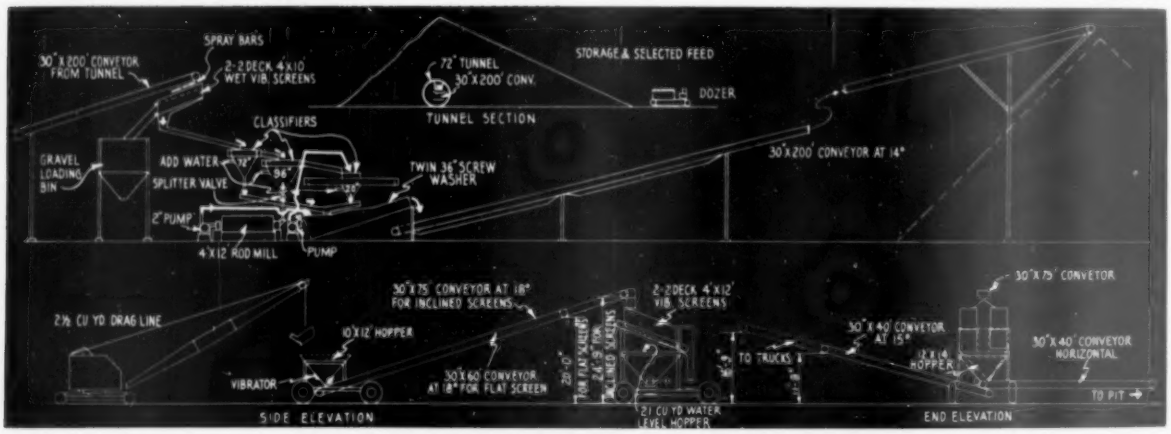
Bin holding drained sand which is trucked to the batching plant in large tractor-trailer haulage units where concrete is produced

mat of "cobbles" is placed under the face stone to act as a drain and a blanket of gravel is placed under the cobbles. The local gravel appears adequate for this purpose.

The pit-run sand is high in the 30- to 50-mesh sizes and tests show as high as 60 percent in that range. The pit averages 30 to 45 percent sand. Lignite content varied over wide degrees so the sand recovered from the preliminary dry screening portable plant is truck-hauled (about 5 mile) to the site of the washing plant located on the east bank of the Missouri where the sand is stockpiled in relatively thin horizontal layers. The pile contains about 180,000 cu. yd. of bedded materials. Along side the main pile is a smaller one of finer sand from another source that is high in fines (minus 50 to 100 mesh). The dozer-equipped tractor attacks the larger pile in such a fashion that a vertical cross section of the pile is pushed over the reclaiming tunnel gates. The same equipment pushes the finer sand from the pile to its feeder. Two Jeffrey feeders are used for the coarser sand with a Syntron on the fine sand. About 5 percent fine sand is blended to the feed belt serving the washing plant.

Washing Plant

The washing plant consists of two Allis-Chalmers scalper screens operated wet, that take out the plus 4-mesh which is binned. The minus fraction flows to three Woods vortex classifiers. There are three units in series, a 72-in., a 96-in., and a 20-ft. dia. unit, and the flow is in that same order. The underflow from the first and the last Wood classifier goes direct to a 36-in. twin Eagle Iron Works screw dewatering unit. The underflow from the second 96-in. classifier, being high in the 30- to 50-mesh size, is sent to a 4- x 12-ft. Ruth rod mill, that not only reduces the 30-50 mesh content of the finished sand, but adds needed minus 100 mesh as well. The rod mill discharge is pumped direct to the Eagle screws. The Ruth rod



Flowsheet of sand and gravel plant which effectively removes excess lignite



Pump installation and pond for supplying wash water in the plant

mill is a standard trunnion feed and trunnion discharge unit. The overflow from the 36-in. twin Eagle screw dewatering unit is pumped back to the 20-ft. Wood classifier. About 1500 g.p.m. of fresh water is added to the system by a Fairbanks Morse well pump located nearby. By recirculating the overflow from the Eagle screws, some 2000 g.p.m. are handled by the 20-ft. Wood classifier. This turbulence and large overflow volume accounts in a measure for the low lignite content of the finished sand. The rod mill is driven by a D-13000 Caterpillar diesel. Other units in the plant are driven by Louis Allis electric motors through Falk reduction units. The two pumps, handling the rod mill discharge and the Eagle overflow, are Amsco-Nagle and Kansas City Hay Press units. The pump on the rod mill is 2 in.

Finished sand is stockpiled over a reclaiming tunnel that serves a truck loading hopper. Goodrich belts, on Universal idlers, are used throughout. A simple method of checking the amount of sand being produced is the use of an ammeter on the stacking conveyor. The ammeter checks the empty load against the running load; it also helps to keep the plant working well toward capacity even when feeding varying amounts of pitrun and scalped material.

The plant has a capacity of 100 t.p.h. and requires one operator. All operating features are controlled from an elevated station in the washing plant. At the time of our second inspection, the work at Garrison was about half completed.

Western Phosphate Deposits

THE GEOLOGICAL SURVEY recently announced availability of a progress report on its investigations of western phosphate deposits. The report is one of several released in recent months, covering cooperative investigations with the Atomic Energy Commission and the Bureau of Reclamation, of phosphate deposits and associated minor metals in the Phosphoria formation in Montana, Wyoming, Idaho, Utah and Nevada. It is the first attempt, however, to summarize progress on all phases of the investigation, to indicate regional trends in the grade and thickness of the deposits, and to describe the location of newly discovered deposits which may be of economic value.

Expanded use of phosphate products has increased national production of phosphate rock from about 4,800,000 tons in 1942 to over 11,000,000 tons in 1952. Most of this added production has come from the Florida field, but production from the western field has expanded nearly 5-fold since 1942 and now accounts for about 10 percent of the total domestic production, according to the report. Much of the western phosphate rock has been used in the electric-furnace manufacture of elemental phosphorus. With the additional sources of cheap power in the offing in the western field, and the phosphate reserves in Tennessee diminishing, expansion of the western industry is expected to continue.

Copies of the report, which includes several location maps, are available for inspection at the Idaho Bureau of Mines and Geology, Moscow, Idaho, and at the Geological Survey offices at Washington, D.C.; Denver, Colo.; Spokane, Wash.; Salt Lake City, Utah; and Montpelier, Idaho.

CONCRETE MIXTURES—Garrison Dam

Mixture Number	Al5[7]	All[7]	A9[7]	(4) Bl7[8]	B8[8]	Chute
Max. Size Aggregate	**1½ in.**	**1½ in.**	**1½ in.**	**3 in. Cse**	**3 in.**	**Slab**
Batch Weights for size batch indicated	4 cu. yd.	4 cu. yd.	4 cu. yd.	4 cu. yd.	4 cu. yd.	4 cu. yd.
Cement	1880	2068	2256	1504	1580	1580
Sand	4766	4622	4474	3854	3810	3760
¾-¾	3764	3648	3532	3574	2626	2590
¾-1½	4602	4460	4320	2858	3030	2990
1½-3				3778	4442	4384
3-6						
Water	914	1004	1096	730	768	768
Total	15926	15802	15678	16298	16256	16072

Cement is Type II low alkali

Portland Cement Production

THE PORTLAND CEMENT INDUSTRY produced 24,134,000 bbl. of finished cement in July, 1953, as reported to the Bureau of Mines. This was an increase of 13 percent compared with the output in July, 1952. Mill shipments totaled 26,480,000 bbl., an increase of 6 percent over the July, 1952, figure, while stocks were 27 percent above the total for the same month in 1952. Clinker production during July, 1953, amounted to 23,185,000 bbl., an increase of 13 percent compared with the corresponding month of the previous year. The output of finished cement during July, 1953, came from 156 plants located in 37 states and in Puerto Rico. During the same month of 1952, 21,342,000 bbl. were produced in 155 plants.

Heavy-Media Processes

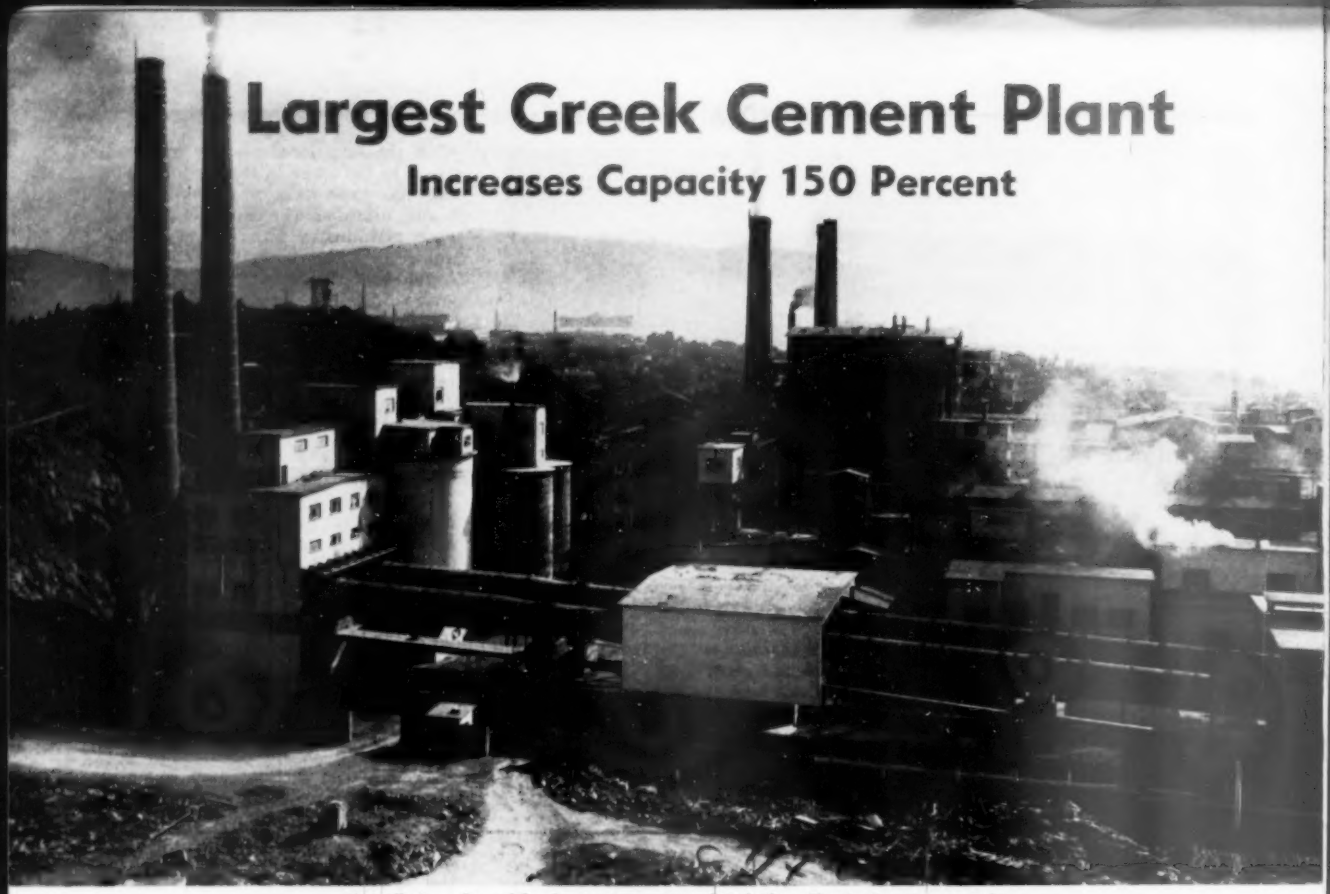
AMERICAN CYANAMID CO., Mineral Dressing Division, New York, N.Y., has announced publication of a 32-page bulletin, entitled "Heavy-Media Separation Processes for Mineral Concentration," the latest bulletin of its "Mineral Dressing Notes" series. Included are descriptions of representative heavy-media plants treating a variety of metallic and non-metallic ores. Listings of plants currently in operation and planned, and a complete bibliography on heavy-media separation are also included. The number of plants using these processes reportediy has grown from only 19 in 1945 to over 175 installations operating, or planned, in 27 countries of the world.

Gravel Survey

THE LOS ANGELES, CALIF., City Council recently appropriated $10,000 for surveying undeveloped areas for commercial deposits of sand and gravel. The survey will be largely concentrated in the San Fernando Valley and, after deposits are located, the areas will be placed in a natural resources zone classification, designed to discourage residence construction or subdivision development. It was stated that close-in development of sand and gravel deposits is essential to the economic development of the San Fernando Valley and contiguous areas.

Largest Greek Cement Plant

Increases Capacity 150 Percent



Overall view of two-kiln, dry process cement plant built at Eleusis, Greece, near Athens

FOUNDED IN 1910, the Société Anonyme de Ciments "Titan," was the first cement company established in Greece, and it owns one of the largest and most modern portland cement plants in Greece, situated in close proximity to the historic village of Eleusis.

Its location on the shore of the Gulf of Eleusis, some 20 km. from the capital of Athens, at the intersection of fine highways, enables the plant to meet economically the requirements of its numerous customers, transportation being effected either by sea, truck or rail. Its vast wharves with heavy lifting gear allow the cement plant to ship out rapidly all deliveries of cement for export.

Société Anonyme de Ciments "Titan" has always reckoned that, being the first cement plant built in Greece, it should also be the first to install a modern cement plant. After the second world war the company therefore did not consider the modernization of its old plant, but decided to build another plant, in conjunction with the existing one though totally independent of it.

The erection of such a plant was amply justified by the ever increasing consumption of cement in Greece. The annual consumption of cement, which in 1923 was only about 35,700 tons, amounted to 233,700 tons in 1930 and 261,558 tons in 1935, reaching 334,133 tons in 1939.

For comparison it may be mentioned that the annual output of the Eleusis plant, which at the time the plant started was approximately 2000 tons, increased gradually to 11,000 tons in 1911, 20,000 tons in 1923, 65,000 tons in 1928, and 140,000 tons in 1939.

But Greece's economic conditions after the second world war were very poor, with public and private finances entirely exhausted. Thanks to a loan granted by the E.C.A., Société Anonyme de Ciments "Titan" was able to extend its Eleusis plant in the years 1949 to 1952.

This extension comprised installations for the production of 600 tons of portland cement in 24 hours, which in addition to the 400 tons of cement produced in 24 hours by the old plant gives a combined output of 1000 tons of portland cement.

It is a dry process plant, and the manufacture is based on hard, crystalline limestone from a quarry situated close to the plant. A plastic clay from a deposit situated at a distance of 12 km. from the factory also is used.

The extension of the plant was effected in two stages, each unit comprising machinery supplied and installed by F. L. Smidth & Co. A/S, Copenhagen, each producing about 300 tons of cement daily.

Arrangement of the machinery in the plant is such that it is always possible to utilize the travelling-crane and storage of the old plant, and the new raw mills and packing plant also can serve the old plant. Other departments of the plant are so arranged that the extensions present themselves as an independent plant.

In the view of the new plant from the top of the limestone quarry may be seen the kiln department, the cement mill department, the crushing department, and the homogenizing installation. Behind the travelling-crane over the storage area may be seen the raw mill department, the packing plant, and the buildings of the old plant.

Quarrying and Crushing

Stone blasted down in the quarry is loaded by a diesel power shovel into dump cars which carry the broken stone to the crushing department.

On arriving at the crushing department, the limestone is dumped into a feed hopper, from which it is carried by an inclined laminated conveyor to a 150 kw., slow-running, F. L. Smidth hammer mill, reducing it to 25 cm. size.

A bucket elevator takes the crushed material to a dust-free chute in the storage area.

Raw Mill Department

Drying and grinding of the raw materials are effected in two air-swept

*Manager, Société Anonyme de Ciments "Titan," Greece.

Societe Anonyme de Ciments "Titan" builds new plant alongside old plant without delaying production. Two new dry process kilns with additional mills and auxiliary equipment increase capacity from 400 to 1000 tons daily or 6000 bbl. of clinker

By CONSTANTIN TSOUNTAS*



Feeder installation for one of the mills

F. L. Smidth mills, taking 550 kw. each. These mills have a diameter of 2.9 m. and a length of 6.5 m. Each mill consists of a ball compartment and a Cylpebs compartment.

Blending Installation and Raw Material Storage

Following each mill is an air separator, from which the coarse material is returned by a screw conveyor to the mill inlet, while the fine material is separated in the cyclone.

Circulating air is supplied by a high-pressure fan, and the heating of the circulating air required for the drying of the raw materials is effected by an auxiliary furnace heated with oil. Dedusting of the excess air takes place in an automatic bag-type filter, divided into nine compartments.

From the electrical control panel, it is possible to control the operation of the entire grinding department.

The raw mill product is transported by pneumatic Fluxo pumps, over a distance of about 160 m., to an automatic distributor which distributes it equally among four silos, in which it is held at different levels; that is, when one of the silos is full the others fill up to three-fourths, one-half and one-fourth, respectively. When a silo is full, the material is drawn off to be taken to the two homogenizing hoppers.

From these hoppers the raw ground product is transported to the storage silo, from which it is drawn by means of pneumatic Fluxoslide channels.

By this method of distribution, an "extension" of the grinding period is obtained, which allows for the elimination of any fluctuation in the uniformity of the material leaving the mills.

Kiln Department

The kiln department comprises two F. L. Smidth 3.3 x 2.85 x 106 m. rotary kilns, and each is equipped with a cooler arranged planetarily in relation to the kiln end. The kilns are fed with nodules from a nodule drum arranged above the inlet of each kiln.

The feed of the raw grind product and the arrangement for addition of water to the nodulizing drum are coupled to the kiln motor and synchronized with it. Thus, a very regular feed is obtained, the water content of the nodules is kept low (10 or 11 percent), and the nodules become resistant.

The kilns have no exhaust fans but are run with natural draft, so that the power consumption is reduced.

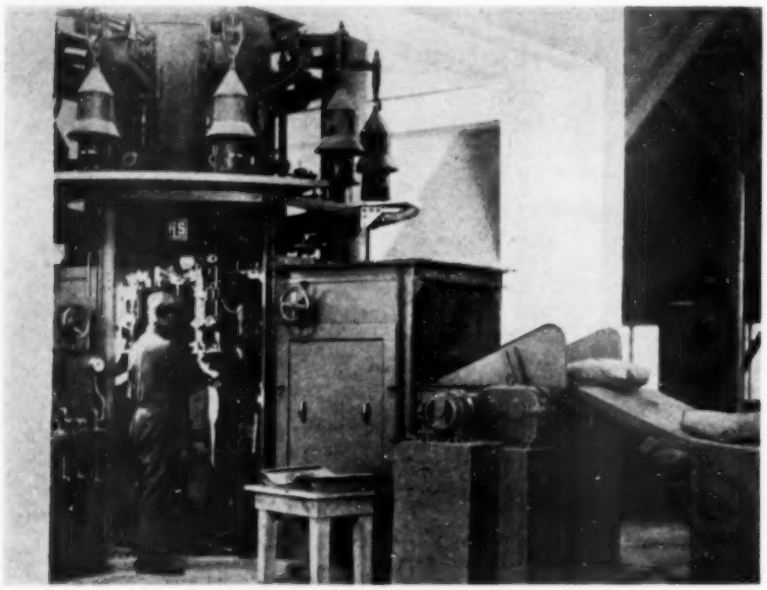
The two kilns are equipped with internal cross fittings in the drying zone. The recent design of the crosses in the kiln is a little different from the design of the crosses in the first kiln. This modification has had the effect of reducing considerably the loss of dust which was already fairly low.

By measurements, 3 percent and 1 percent of dust were found, measured on the amount of raw product in the

Two views of cement kiln, one looking toward stacks, and the other showing the firing end







Type of cement packer used in the new plant

stacks of kilns Nos. 1 and 2, respectively. The kilns are not provided with dust filters. The kilns can be fired by oil or by coal, or by a mixture of these two fuels.

The following data on the operation of the kilns since starting up have been provided by the plant.

The output of each kiln is about 300 tons (1800 bbl.) of clinker per 24 hours. The kilns are fired by oil, and during normal operation, the heat consumption is 1035 k. cal. per kilo clinker, measured for the net calorific value. At the same time the power consumption is very low: for the kiln, the primary-air fan and the nodule drum it is 8.5 kw.h. per ton of clinker.

The long type of kiln was adopted with a view of ensuring low maintenance cost and efficient kiln operation with long running periods.

The operation of the kilns and the oil firing gear as well as of the coal grinding installations can be controlled from a control panel installed at the burners platform.

Cement Mill Department

For grinding clinker, a No. 24 x 11 meter Unidan mill, requiring 660 kw., and a No. 24 x 8.8m. Unidan mill taking 530 kw., have been installed. The two mills are arranged for direct grinding and are fitted with installations for internal water cooling. With the object of ensuring a constant cement temperature and preventing condensation in the filter, which is an automatic bag-type unit, the water addition is controlled by means of contact thermometers and interlocking devices between the mill motors and the water pumps etc. The feeding of clinker to the mills takes place by means of Pendan devices, ensuring the feeding of constant amounts of clinker to the mills and recording these quantities.

From the mills the cement is taken direct to the Fluxo pumps, which transport the cement pneumatically to cement storage about 180 m. from the cement mill department. On the floor, close to the feeders for the mills, control panels are installed from which the injection of water into the mills and the operation of the Pendan devices are controlled.

Packing Department

For the packing of the cement into jute bags and paper bags a 10-spout rotary Fluxo packer has been installed, and a 12-spout rotary Fluxo packer was placed in service in 1953.

The cement is packed for transportation from the plant in trucks and ships. The loading of the trucks takes place by means of portable belt conveyors push-button controlled by the truck operators. Loading into ships is effected directly by an adjustable belt conveyor carrying the cement to the ships.

Cement transportation from the Fluxo packer, as well as the belt conveyors for filled cement sacks, is controlled from a control panel installed beside the packer.

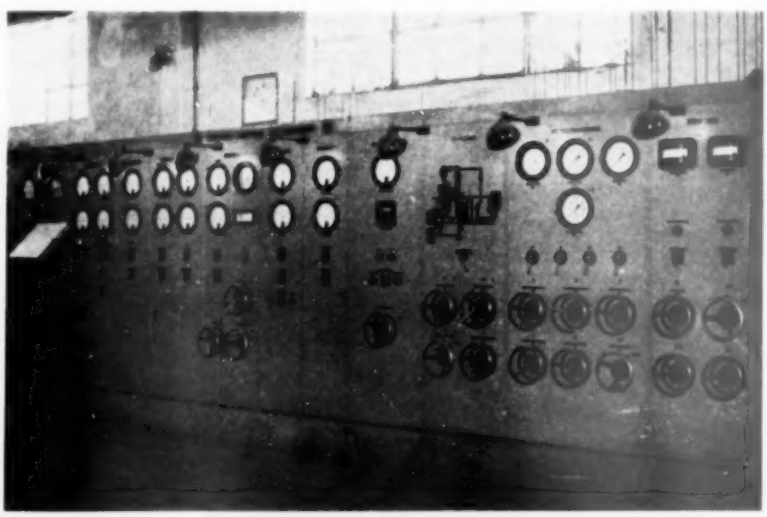
Due to high fuel prices in Greece, particular importance has been attached to the question of good fuel and power economy. Kiln fuel economy has already been mentioned. The power consumption is also low, but unfortunately there are no facilities for measuring this consumption exactly, the power consumption of the old plant and of the new one being combined. However, it was ascertained in 1952 that the power consumption per ton of cement produced was 103 kw.h. for the old and the new plant together.

By contrast, the power consumption in 1950 was of the order of 115 to 118 kw.h. per ton of cement produced.

In 1952, 250,000 tons of cement were produced, of which 160,000 tons came from the new plant and 90,000 tons from the old plant. This means that the power consumption of the new plant is 90 kw.h. per ton of cement produced.

The order for the first plant was placed in 1949 and it was started up in August, 1951. The second plant, which was ordered in 1950, was put in operation in January, 1952.

Starting up of the two plants took place without any difficulty, and particularly noteworthy is the ease with which the firing of the kilns was effected, the kilns attaining successively, and without any hitch, their normal output of 295-300 tons of well-burned clinker per 24 hours after the fourth day of operation.



Electrical control panel for cement plant

LIME—

Ubiquitous Neutralizing Agent

Abstract of a paper* presented before the annual convention of the National Lime Association at Hot Springs, Va.

RESEARCH STUDIES ON LIME, which have been carried on at Mellon Institute since 1938, have revealed important data concerning neutralization economy, influence of calcination practice on reactivity, and the effect of proper slaking on reactivity.

To start out, Mr. Hoak said that while lime is more widely used than all other substances for neutralizing acids because of its cheapness and general availability, yet many misconceptions still persist about its chemical properties and proper use. Some users believe that all limes are much the same, he said, whereas, as lime manufacturers well know, the great variations in composition and structure of limestones from different quarries, and different calcination practices, yield products of widely differing properties.

Impurities, principally silica, iron oxide and alumina, and the wide ranges in magnesium carbonate in limestones were discussed in their effects on lime used for neutralization. Stone with less than ten percent magnesium carbonate was defined as high calcium limestone; stone with more than ten percent as magnesium limestone. Dolomite is a definite mineral, he said, with a crystalline matrix of the double carbonate of calcium and magnesium. In some limestones the two carbonates are not so crystallized but are intermingled in approximately equimolar proportions. Where magnesium carbonate is in greater proportion than calcium carbonate, the stone is classified as dolomitic magnesite. This great variety of raw materials results in limes varying over a considerable range in their properties.

Delivered price, basicity and reactivity were discussed in detail as they bear on economy in neutralization. With many industrial plants spending more than $100,000 annually for lime to neutralize acidic waste waters, he said that there is opportunity to realize substantial savings through proper plant design and operation.

Whereas the cheapest agent for neutralization is considered desirable, he stressed that differing chemical properties in limes selling at the same price make delivered cost per ton an unsound method of evaluating cost. Buying a premium price product can often result in a net gain in operation. The purchaser really is buying available basicity and should realize that he is paying the same price for the inerts in lime as he does for the reactive fraction. Actually the cost is more because of increased sludge volume without adding to the reaction, which increases sludge removal cost. Cost per unit of basicity must be the basis for comparing prices of neutralizing agents.

Chemical analysis of lime takes time and is not a dependable measure of available basicity, he said, because some of the calcium and magnesium oxides may combine with silica, iron oxide and alumina during calcination to form compositions insoluable in acids. Where the stone has appreciable inerts, potential basicity may be reduced markedly, particularly if overburning has been substantial. Also, he reminded that the reactivity of lime decreases with the degree of overburning.

Available basicity should be measured under conditions simulating actual use, he said, and that may be done easily in laboratory procedure which he described.

In discussing reactivity, he said that a wide range of values results depending upon the composition and structure of limestones plus calcination practice. Highly reactive limes are usually necessary for best neutralization efficiency which is important to capital and operating costs of a treatment plant. The more active the lime, the smaller the neutralization plant required. Normally, lime suspensions that settle slowest are the most reactive.

In discussing reactivity of lime and magnesia, which react with water and go into solution as hydroxides—calcium hydroxide being slightly soluble and magnesium hydroxide rather insoluble—he said that the rate at which they can react with an acidic liquor depends upon their rates of solution. Exposed surface has direct bearing on the rate of reaction, the most reactive limes being those which yield the finest particles when hydrated. Mr. Hoak pointed out that certain substances increase solubility in water while some decrease it.

Calcination practice was pointed to as the most important factor responsible for reactivity. Whereas true density of lime varies very little, apparent density can be widely variable and partly by the manner in which it has been calcined. A fairly pure high calcium stone, when properly calcined, can yield a lime of more than 50 percent pore space.

Impurities in lime tend to increase reduction in surface area by lowering the softening temperature and, in addition, combine with calcium and magnesium oxides at high temperature to form compounds which cause part of the lime to become wholly or partly inactive. Calcination technology has an important effect on reactivity, he stressed, because reactivity is a function of both surface area and calcium oxide content.

Burning must be carefully controlled when calcining magnesian limestones because the difference in dissociation temperatures of the two carbonates will result in some overburning of the magnesia, assuming complete dissociation of the calcium carbonate fraction. Reactivity of magnesia, of course, decreases with the degree of overburden and he said that overburning can easily make it inert.

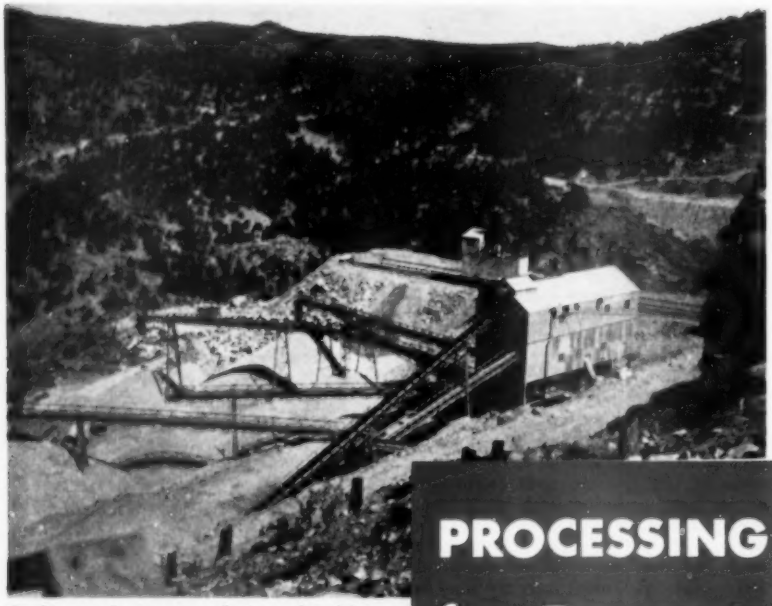
The lower combining weight of magnesium oxide which permits it to neutralize about 1.4 times as much acid-equivalent as calcium oxide and the fact that magnesium sulfate is about 150 times as soluble as calcium sulfate were mentioned as the principal advantages which magnesian and dolomitic limes have over high calcium lime. A purchaser usually pays less per unit of basicity in proportion to its magnesia content when he buys magnesian lime and the cost of sludge removal is also reduced.

These desirable properties are offset by several important disadvantages which Mr. Hoak discussed. The magnesia fraction of a lime is most reactive in strongly acid solutions, its reactivity decreases rapidly as the pH rises above 6 and is not reactive at all with high pH solutions. Examples were given to illustrate the peculiarities of neutralization with dolomitic lime. In one simple operation, high calcium lime rapidly neutralizes the acid in spent liquor from pickling steel with sulfuric acid. When a milk of dolomitic lime is used under the same conditions, it takes five hours or more to complete the reaction, as compared to 15-20 minutes. When the two reactants are mixed, the lime fraction reacts quickly, raising the pH of the solution, but the reactivity of the magnesia decreases progressively as neutralization approaches completion. Thus, time becomes the important factor.

The oxidation of ferrous iron can be promoted by exposure to air, which can be done by agitation, and by temperature increase, it was pointed out,

(Continued on page 126)

*Richard D. Hoak, Senior Fellow, Mellon Institute of Industrial Research, Pittsburgh, Penn., is the author of the paper.



Crushing and screening plant to the right with stockpiling conveyors. In the background is the aerial tramway tower to handle concrete to the dam site

Macco-Puget Sound operates sand and gravel plant at 7300-ft. elevation, probably the highest, large-capacity plant in the United States. Sand processing of particular interest

By WALTER B. LENHART

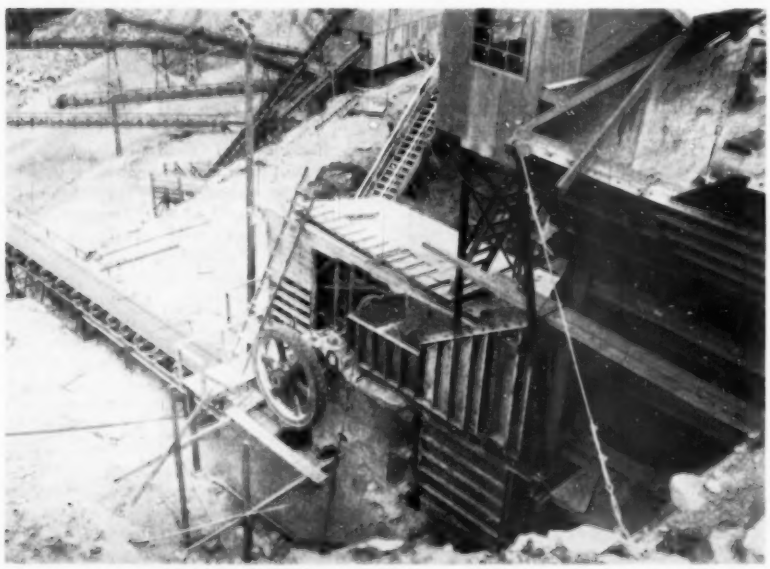
PROCESSING AGGREGATES for Denver's Dam No. 22

A GRAVITY ARCH TYPE CONCRETE DAM is being built by Macco-Puget Sound on South Boulder Creek some 35 miles northwest of Denver, Colo. The prime contractors are the Macco Corp., Paramount, Calif., and the Puget Sound Bridge & Dredging Co. of Seattle, Wash. The project, designated Dam No. 22, is a part of the domestic water supply system for the mile-high city.

The construction site is in a narrow canyon at an elevation of 7300 ft. The dam will be 340 ft. high with a crest length of about 1000 ft. It will contain 588,800 cu. yd. of concrete and will form a reservoir of about 42,000 acre feet. It is the highest concrete dam in Colorado and ranks with Ross dam on the Skagit river in Washington, owned by the city of Seattle, as being one of the highest concrete dams ever constructed by a municipality.

Aggregate Plant

Gravel is used as the coarse aggregate along with natural sand to which is added sand from a rod mill set-up. The aggregate is transported some 14 miles by a fleet of four 50-ton capacity, 300-hp. Kenworth semi-trailer units over roads built and maintained by the contractor. The washing and screening plant is located high on the side of the South Boulder Creek canyon and above the crest line elevation of the dam itself. There just isn't any level spot available so the aggregate storage piles literally cling to the sides of the steep canyon slopes. High winds in the area are a factor where exposed belt conveyors are used as at Dam No. 22. The plant is probably one of the highest above sea-level ever built in the United States. Service roads to and from the aggregate washing and screening plant, crushing plant, dam site and inhabited areas are extensive. Winter conditions are severe with roughly a seven to eight months' operating season. State highway No. 72 through Arvada from Denver is paved about two-thirds of the total distance, but the un-paved section has typical Rocky Mountain grades and a passenger car has to be operated in second gear at times.



Looking down at 40- x 42-in. primary jaw crusher fed by apron feeder

The aggregates, the concrete, and the placing are all being done under specifications similar to those of the United States Bureau of Reclamation, and inspectors on the job received a 90-day training period for their jobs under the direction of the Denver staffs of the Bureau of Reclamation. Near Denver, at Federal Center, the Bureau of Reclamation has research and control laboratories for the Bureau's construction activities.

The original contract was for $7,120,000 with all portland cement and steel being furnished by the city of



A 2½-in. pump handles rod mill discharge



Other side of screening and crushing plant showing secondary cone crushers, below

Denver. The modern aggregate plant is quite extensive and is enclosed for winter operations. It uses a 42- x 40-in. Allis-Chalmers primary jaw crusher that is fed by a Telsmith apron feeder. The crusher off-bearing belt is 48 in., and it serves a 6000-ton live storage surge pile ahead of the main plant. The primary crusher is set to deliver a minus 6-in. product.

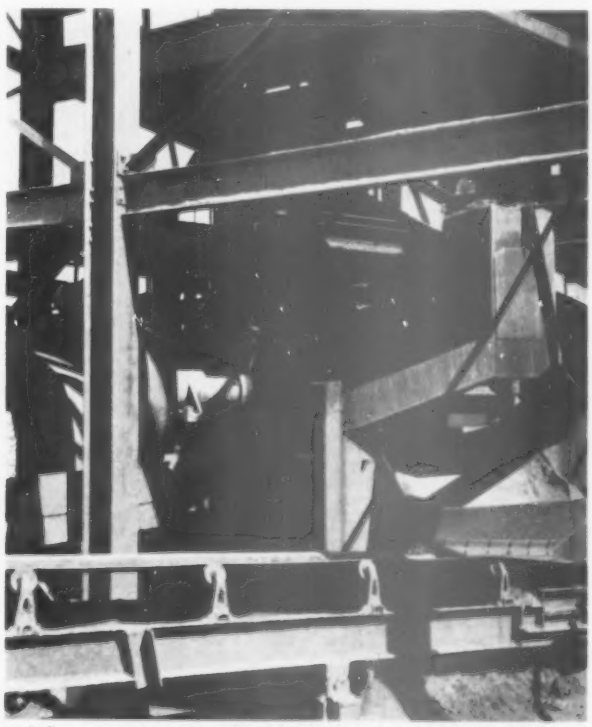
Four sizes of coarse washed aggregate are prepared. These are:

minus 6 -in.	plus 3 -in.
minus 3 -in.	plus 1½-in.
minus 1½-in.	plus ¾-in.
minus ¾-in.	plus No. 4

One size of concrete sand is prepared. The aggregates are stored in open piles with reclaiming belt conveyors fed by Syntron feeder, operating in tunnels below. Over the batching plant there are two 4- x 16-ft. Symons double, split-decked screens so that the coarser sizes can be rinsed or even re-screened if desired. These screens are served by a 30-in. inclined belt conveyor, 762-ft. centers. The interior of the mass concrete uses a three-bag mix with a four-bag mix for the exteriors. An air entraining agent is used.

At the time of the first inspection in the fall of 1952, aggregates were being secured from deposits relatively close to the construction site. The deposits being in relatively narrow canyons, where stream flow velocities are at times high, added up to two serious defects; they were relatively small in size, and of such character, both physically and mineralogically, as to make





Left: Rod mill installation to provide added fines in concrete sand. Short belt conveyor above supplies bins feeding 6- x 12-ft. rod mill below. Right: A 4- x 10-ft. rotary brush-type, vacuum sand wheel

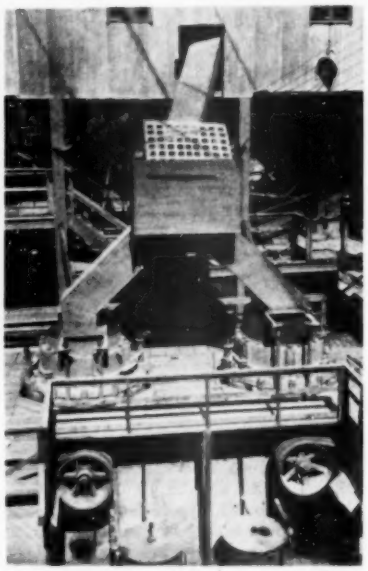
it difficult for the plant to adequately process the materials. As a result, and after some delays, a deposit at Eldora near Pinecliffe was purchased from the Cooley Gravel Co. To reach the new deposit the contractors had to build 13.2 miles of additional service roads. Loading in the pit is by a 2½-cu. yd. shovel.

Sand specifications are as follows:

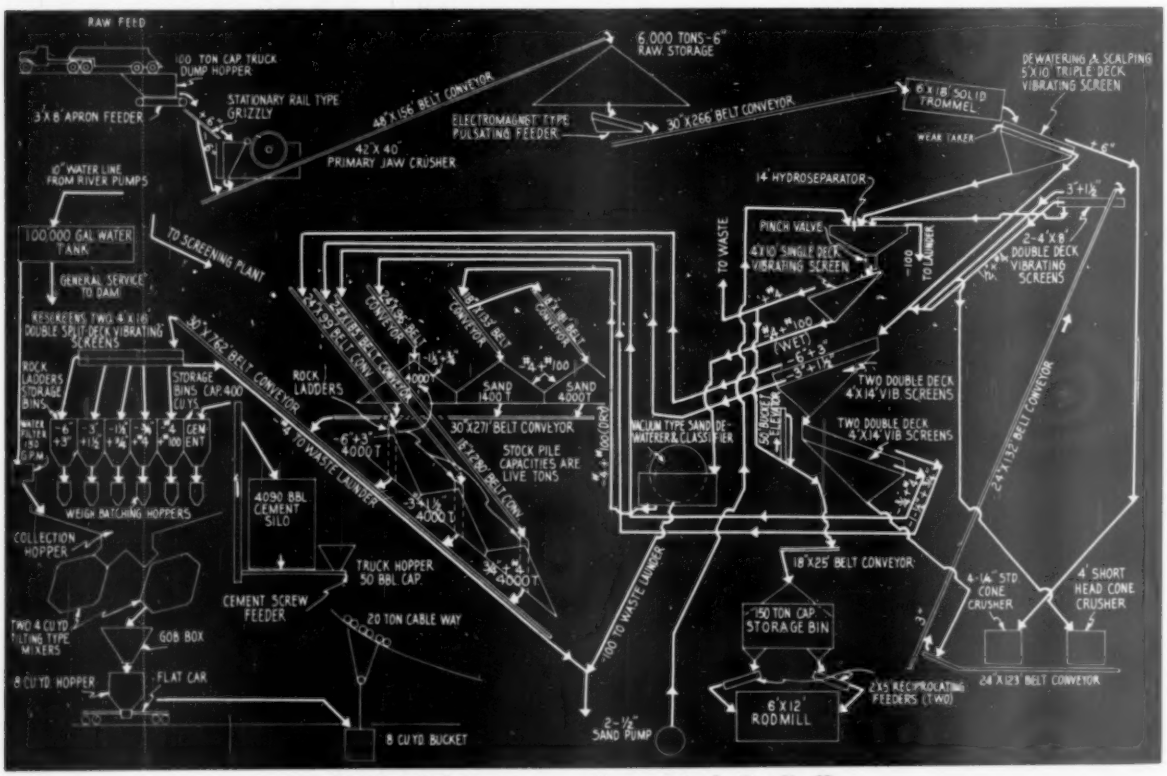
Mesh	Percent Passing
4	95-100
8	80- 90
16	60- 80
30	30- 60
50	10- 30
100	2- 10
F.M. 2.77	

Add Manufactured Sand

The natural sand is heavy in the intermediate sizes so a fraction of the sand from the preliminary setup is sent to a 6- x 12-ft. Marcy peripheral discharge rod mill. The mill is fed at both ends by individual 2- x 5-ft. Telsmith reciprocating feeders, and the mill discharges through ports in the center line of the shell. The mill has a rated capacity of 50 t.p.h., but at this installation is handling about 15 t.p.h., using a relatively small rod load. This tonnage, when pumped back to the hydroseparator, is sufficient to give the added 100-mesh material needed, hence the relatively low feed requirements. The hydroseparator is a 14-ft. diameter Wemco unit which receives its feed from the lower deck of the 5- x 10-ft. Tyler three-deck scalper screen, operated wet. The rod mill discharge pulp is returned to the Wemco hydroseparator by a 2½-in. Wilfley sand pump. The flow sheet gives the details of the washing and screening operation. However, it might be well to point out that the above mentioned scalper prepares a minus No. 4 material which goes to the hydroseparator. This unit discharges to a 4- x 10-ft., single-deck vibrating screen that paradoxically prepares a plus No. 4 and a minus No. 4 mesh material. As there is more plus material than is required, some of it can be by-passed and wasted, or sent to the rod mill. As the plant recovers 100 t.p.h. of specification sand, it will be observed that a considerable tonnage must pass over this screen. The throughs from this screen pass to a 4- x 10-ft. Conveyor Co. rotary brush type, vacuum sand wheel, and the finished sand is moved by belt conveyor to stockpiles. As shown in the flowsheet, there are two stockpiles for sand. This permits adequate drainage time. The reclaiming gates are all of the straight gravity type. Several installations of the sand wheel are found on the West Coast. This sand wheel in its essential design is similar to other sand wheels, however, the bottom of each pocket of this machine is made up of a long revolving brush. A small amount of vacuum is applied to the underside of this brush so that the excess water in the sand is pulled out. The brushes revolve a fraction of its circumference with each revolution of the main wheel so that a new and cleaner brush surface is exposed to the vacuum. The wheel delivers a sand of relatively constant and low water content. The wear of brushes is nominal.



Close-up view of secondary crushers, a 4¼-ft. standard and a 4-ft. short head cone crusher, used to reduce plus 6-in. gravel to minus 3-in.



Flowsheet of plant set up to provide aggregates for Dam No. 22



Tower for aerial tramway used to transport concrete buckets to dam site

All aggregate from the surge pile is given a preliminary scrubbing in a 6- x 18-ft. rotary trommel ahead of the scalping screen. The trommel, supplied by Patten Engineering Co., operates at 14 r.p.m. All plus 6-in. gravel from the scalper passes to two Symons cone crushers alongside the main processing plant. One of these crushers is a 4¼-ft. standard cone and the other a 4-ft. short head. These are set to deliver a 3-in. product that is re-screened on two 4- x 8-ft. Symons double-deck screens and the plus fractions are returned to the two Allis-Chalmers screens that follow the scalper. The minus fraction from the lower deck of the crushed stone screens is sent to the hydroseparator. The plant has a capacity of 400 t.p.h. Rock ladders are used on the coarser sizes.

Bulk cement from the plants of the Ideal Cement Co. is delivered by rail to a point a few miles from the dam site where unloading and storage facilities have been provided. Trucks deliver from this bin to the construction site. The batching plant uses two 4-cu. yd. Koehring tilting type batchers.

O. H. Tucker is vice-president, Macco Corp., sponsor, and F. D. Hudkins, project superintendent. J. J. Jeffries is aggregate plant superintendent.



Stone ladders are used in stockpiling coarse aggregates to reduce segregation

Refractory Products

CLEVELAND QUARRIES Co., Cleveland, Ohio, recently announced the formation of Silica Chemicals, Inc., in South Amherst, Ohio, as a wholly owned subsidiary, for the purpose of manufacturing refractory and chemical products. Plans are being made for the subsidiary to produce a new furnace lining material developed in the parent company's research laboratories. Plans also call for an expansion of research activities with a view to the development and manufacture of other chemical products by the new concern.

Buys Phosphate Lease

J. R. SIMPLOT, Idaho industrialist, has purchased a phosphate lease at Rex Peak, Utah, from W. H. Cranmer and John Archer, Salt Lake City, Utah. The phosphate mined will be used in a triple superphosphate fertilizer plant placed in operation recently by Mr. Simplot at Pocatello, Idaho.

Private Financing

TWELVE COMPANIES involved in various phases of heavy construction and road building obtained $149,000,000 from life insurance companies and other long-term investing institutions in 1952, according to *The 1953 Yearbook of Private Placement Financing*, published by E. V. Hale & Co., Chicago private placement specialists. Included in this grouping are six cement manufacturers with loans totaling $20,500,000. Largest of the loans to cement manufacturers was an issue of $6,000,000, 15-year, 4.25 percent notes of Medusa Portland Cement Co., Cleveland, Ohio. Missouri Portland Cement Co., St. Louis, Mo., sold $5,800,000, 3.875 percent notes, due 1968, and North American Cement Corp., New York, N.Y., sold $3,000,000, 4.215 percent, 16-year first mortgage bonds. Other loans included $2,500,000 to Dragon Cement Co., Inc., Thomaston, Maine; $2,200,000 to Calaveras Cement Co., San Francisco, Calif.; and $1,000,000 to Kosmos Portland Cement Co., Inc., Kosmosdale, Ky.

Gypsum Production

DOMESTIC MINE PRODUCTION of crude gypsum during the first quarter of 1953 amounted to 1,863,315 short tons, or 3 percent more than in the first quarter of 1952, and the second highest first-quarter output on record, as reported by the Bureau of Mines. Imports were 9 percent higher than in the same period of 1952. The output of calcined gypsum, totaling 1,718,484 short tons, was 9 percent higher than in 1952.

Most gypsum products were produced and sold in greater quantity during the first quarter of 1953 than in the corresponding 1952 period. Gains were reported in all of the uncalcined uses, especially agricultural gypsum, which was up 21 percent. The output of plate glass and terra-cotta plasters was up 40 percent. Gains and losses among the building plasters were irregular. Sanded plasters (including perlite) were up 64 percent, while "other building plasters" gained 32 percent. Base-coat and gauging plasters, however, declined 9 percent and 7 percent respectively. Important increases were also noted in lath, wallboard, laminated board and sheathing.

The production of gypsum and gypsum products for the first quarter of 1953, compared with 1952 output, was reported by the Bureau of Mines as follows:

	Short Tons	
	1953	1952
Crude gypsum:		
Mined	1,863,315	1,806,237
Imported	443,511	400,679
Calcined gypsum produced	1,718,484	1,582,175
Gypsum products sold or used:		
Uncalcined uses:		
Portland cement retarder	377,968	334,839
Agricultural gypsum	224,296	185,280
Fillers and unclassified	6,252	5,926
Industrial uses:		
Plate-glass and terra-cotta plasters	15,523	11,121
Pottery plasters	11,904	11,471
Dental and orthopedic plasters	2,834	2,495
Other industrial uses	36,078	42,397
Building uses:		
Plasters:		
Base-coat	411,877	451,841
Sanded	64,747	39,469
To mixing plants	2,883	3,316
Gauging and molding	41,098	44,057
Prepared finishes	3,179	4,126
Other building plasters	56,785	43,122
*Keene's cement	12,963	13,086
*Lath	579,491	508,785
*Wallboard and laminated board	898,188	738,236
*Sheathing	28,041	23,330
*Tile and miscellaneous	4,730	7,602

*M sq. ft.

Producing Stone For Atomic Projects



View of quarry operations shows two shovels loading rear-dump trucks, compressors and wagon drills. There are three benches being worked with the faces kept from 12 to 15 ft. high

Ralph Rogers & Co. of Ohio operating new quarry and plant near Latham, Ohio to supply aggregates for A.E.C. projects

MANY OF THE INHABITANTS of the lower Ohio River valley look with some distrust at the atomic energy developments that have tended to upset their daily lives. Some welcome the spending of billions of dollars for new construction that precedes the operation of the A.E.C. plants. Others deplore the influx of migratory workers and the establishment of "boom towns" in their midst, and some are not at all secure in the knowledge that their particular area may be a hostile military prime target. The citizens of the little towns of Waverly, Piketown and Sargents awoke to find thousands of workers coming into the area to pioneer the A.E.C. development of the multi-billion dollar installations that will flank the east bank of the Scioto river between Chillicothe and Portsmouth, Ohio. Many of these men are building new roads, widening others and the "detour" sign is ever present. The construction program is expected to last four years more, and at top efforts some 25,000 men are expected to be employed.

The area selected is for the most part rough, brush-covered land, and aggregates for construction work are not plentiful although near the outer perimeter of a circle, roughly 25 miles in diameter from the key construction area, there are several aggregate pro-



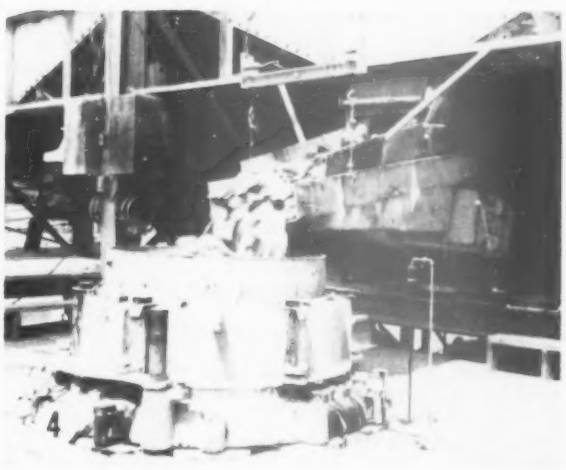


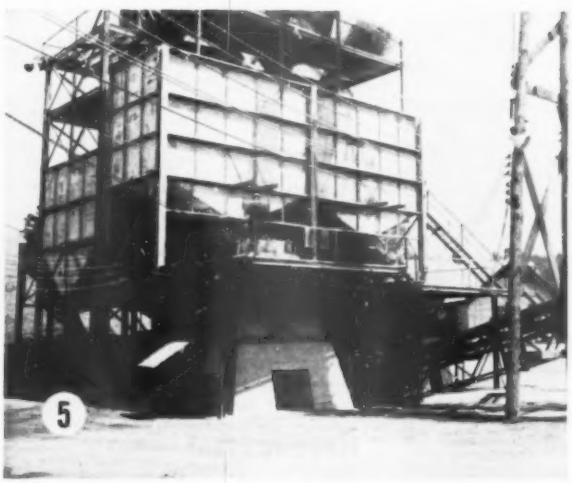
Left: Electric "load lifter" over primary crusher easily handles large rock. Right: About 600 t.p.h. is trucked out of the plant on a 20-mile haul. Three loaders reclaim from ground-stored material





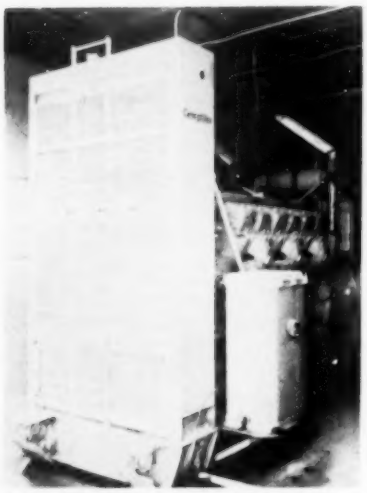








Screening and crushing plant operations. (1) Apron feeder under truck hopper supplies 36- x 48-in. primary jaw crusher. (2) Screening and secondary crushing plant; two belt conveyors inclining up to plant serve the two secondary cone crushers. (3) Close-up of belt conveyors, showing how return belt from secondary crushers may distribute stone to either or both belts to the plant; to the right is the main belt conveyor from the primary crusher. (4) A 4½-ft. standard cone crusher fed by electric vibrating feeder; to the left of this crusher is the 5½-ft. short head cone crusher which has a similar feeding arrangement. (5) Each of the two bins serves a cone crusher. (6) Short belts under the cone crushers carry the products to the return belt



One of two 260 kw. diesel-electric units supplying power

ducing plants owned by old, established companies. Therefore, to meet the large demand for sand and gravel and crushed rock, all material has to be hauled into the area. Four new producers started in the area; however, two of them did not proceed very far. One, a gravel operation, did not continue operations because of the scarcity of gravel in the deposit. The second was a quarry operation. Both plants were of the portable type. The two operations that did survive were built by companies not native to Ohio, although their names are well known to the rock products industries. One of these is Ralph Rogers & Co. of Ohio. Mr. Rogers has operations near Oak Ridge, Tenn., another atomic energy center; Bloomington, Ind., and elsewhere.

Open New Quarry

The new quarry and plant of Ralph Rogers & Co. of Ohio is located near Latham, Ohio and about 20 miles from the A.E.C. construction site. The plant started during February of 1952. It is a quarry operation, producing roughly 600 t.p.h., all of which is hauled by truck to the place of use. The company has approximately 200 trucks under lease. Practically all the trucks are two axle jobs that haul 8 to 8½ tons per load.

The plant is a busy one with a truck leaving the plant every 40 to 60 seconds. About 99 percent of the new plant's output is minus 2-in. crusher run. As the stone is a clean, relatively hard and tough high-calcium limestone, washing is not required so the plant set-up is quite simple. The rock is slightly damp so the operation makes very little dust.

Loading in the quarry is by two No. 6 Northwest shovels with 1½-cu. yd. buckets. These load to a fleet of seven 15-ton capacity Euclid rear-dump trucks. The haul is up-grade out of the pit for a total distance of about 1200 ft. The grades are nominal. Stripping is from 3 to 10 ft., and a quarry of considerable size has been opened up with three working benches that are kept low—in the 12 to 15-ft. range. Primary drilling is done with six FM-3 Ingersoll-Rand wagon drills, with air being supplied by three No. 600 Ingersoll-Rand compressors. A small amount of water collecting in the quarry is pumped out by semi-portable pumping equipment.

The equipment in the plant includes a 36- x 48-in. Lippman jaw crusher, a 4¼-ft. standard Symons cone crusher, a 4 ft. short head, and a 5½-ft. short head of the same make. Over the primary crusher is a Shaw box load lifter for handling large rock in the unit. The scalper screen is a 5- x 14-ft. Robins three-deck screen, with two 5- x 14-ft. Simplicity two-deck screens for the finish work, all operated dry. Oversize products go to two steel bins alongside of each other. One bin holds rock that is approximately minus 6 in. plus 4 in. The other bin holds rock that is smaller; in the minus 4 in. plus 2 in. range. The larger rock goes to the 4¼-ft. standard cone, and the smaller rock to the short head. Each cone is fed via a Jeffrey electrically vibrated feeder, and both crushers receive a large volume of stone.

Under each cone crusher is a short stub conveyor. These deliver at right angles to the main off-bearing belt. This main reject belt can unload to the belt from the primary crusher, or all or a part can go to a parallel belt with the material going to the final screens, thus by-passing the scalper screen. Normally, the belt from the primary crusher serves the Robins scalper. The cone crusher set-up with the electrically vibrated feeders and the off-bearing system is a neat and efficient arrangement. All finished products fall to steel truck loading bins. Finished material can be stockpiled by a short inclined stacker belt or by Euclid rear dump trucks. Ground stored material is reclaimed by three Haiss loaders and a 22-B. Bucyrus-Erie shovel. All material from the plant is weighed on a set of Winslow truck scales. The office is air-conditioned.

At the start of operations, primary electric power was from two 260 kw., 12-cyl., Caterpillar diesel-electric sets, but commercial power was installed late in June. No railroad serves the plant.

Hugh Stephenson is manager of Ralph Rogers & Co. of Ohio and Cecil Parker is superintendent.

Agstone Plant

SHAWNEE STONE CO., Powell, Ohio, recently began operation of its new agricultural limestone crushing and grinding plant at its quarry location near Dublin, Ohio.

Test Results of Aggregates

THE BUREAU OF PUBLIC ROADS recently announced publication of a new bulletin, "Results of Physical Tests of Road-Building Aggregate," which reports the results of tests performed by the bureau's laboratory on more than 9700 samples of ledge rock, crushed stone, gravel, and blast-furnace or smelter slag, and more than 3400 samples of natural or manufactured fine aggregate.

For both coarse and fine aggregates, the bulletin reports the name or lithological composition of the material and results of tests of bulk gravity, absorption and soundness. In addition, test results of abrasive loss, crushing strength, hardness, toughness and weight of compacted aggregate are given for the coarse aggregates. For fine aggregates, test results of grading, fineness modulus organic matter content and mortar strength are also given. The results are tabulated separately and alphabetically arranged by state, county and nearest town.

The bulletin is available from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D. C., at $1 per copy.

Eastern Producers Hold Outing

THE NEW YORK STATE CRUSHED STONE ASSOCIATION held its annual outing at the Schuyler Meadows Club at Loudonville, N.Y., September 10, with members of the New York State highway groups, general contractors, and representatives of the national association as guests. A luncheon, cocktail hour and golfing were the principal highlights of the day's activities. Representatives of the National Crushed Stone Association attending the meeting included J. R. Boyd, executive secretary; A. T. Goldbeck, engineering director; and Paul Gray, field engineer.

Officers of the New York association are: Clarence A. Munz, president; Wilson P. Foss, III, vice-president; Leonard Marquoit, treasurer; and Clifford V. Tobin, executive secretary.

Celebrates Anniversary

WESTERN MINERAL PRODUCTS CO., Minneapolis, Minn., recently celebrated its 25th anniversary as a vermiculite processing company. A perlite plant was purchased last year to expand its operations to both vermiculite and perlite processing.

Haydite Plant

OKLAHOMA LIGHTWEIGHT AGGREGATE CO. is building a $250,000 Haydite plant at Choctaw, Okla. The new plant will serve the Oklahoma City area. It is one of a number of lightweight aggregate plants owned by Texas Industries, Inc., Dallas, Tex.

ROD MILL
Brings Sand Production Into Balance

Dixie Sand and Gravel Corp., Chattanooga, Tenn., has auxiliary rod mill installation to produce fine sand from surplus pea gravel. Acquire ladder dredge and diesel tow boat

By BROR NORDBERG

IN MOST ROD MILL INSTALLATIONS in the sand and gravel industry, the plants use this equipment to reduce gravel into sand sizes. The plants are usually of two general types. One is the new, large capacity commercial plant which has incorporated such mills in its basic layout. The other is the special plant built to supply aggregates for the construction of concrete dams or other large concrete structures, which is usually near the jobsite.

Most of these rod mills have relatively large capacity. The big commercial plants using them, ship concrete sand over a wide area. Many of these plants, and the special project plants as well, by necessity have had to be located in areas where the only available deposits have shortcomings in their distribution of particle sizes. Usually, there is a shortage of fines in the sand, or a deficiency in sand itself, and there is an accompanying excess in pea gravel or other sizes available for reduction into sand.

The rod mill has proved to be an economical machine for the reduction of gravel into sand sizes, and can often be used to good advantage in established commercial plants of more modest capacity.

A small unit operated in the plant of Dixie Sand and Gravel Corp., Chattanooga, Tenn., since 1950 has brought production closely into balance with demands in this market area, and enabled the company to dispose of surpluses profitably. The rod mill is not part of the basic flowsheet but has been incorporated into the existing plant as an auxiliary operation to process a fraction of the material flow.

This plant is a Tennessee river operation that has been in production since 1921. Sand and gravel are dredged from the river bed 30 miles downstream from Chattanooga and transported in steel flatdeck barges for crushing, washing and screening in a land plant at Chattanooga. Capacity of the plant is 175-200 t.p.h. of gravel and sand. The plant was built primarily to produce concrete aggregates.

Balance Sand Requirements

Like most river deposits, there are wide variations in the ratio of sand to gravel sizes as dredged. The percentage of oversize gravel has variations and the fines in the sand sizes fluctuate. A barge load of river-run material might contain 20 or 30 percent sand or the amount might be 60 percent or more of the total, depending upon dredging conditions in the river. Production of natural concrete sand has averaged almost one-half of total tonnage over the years. No masons sand is produced.

Most of the tonnage of gravel produced is ¼-to 1-in. material but, over the years, large excesses of ¼- to ½-in. pea gravel had accumulated. This is a size for which there is relatively little demand in the market area served. Along with this excess of pea gravel, a shortage of concrete sand, as required for expanding markets, has been developing over recent years.

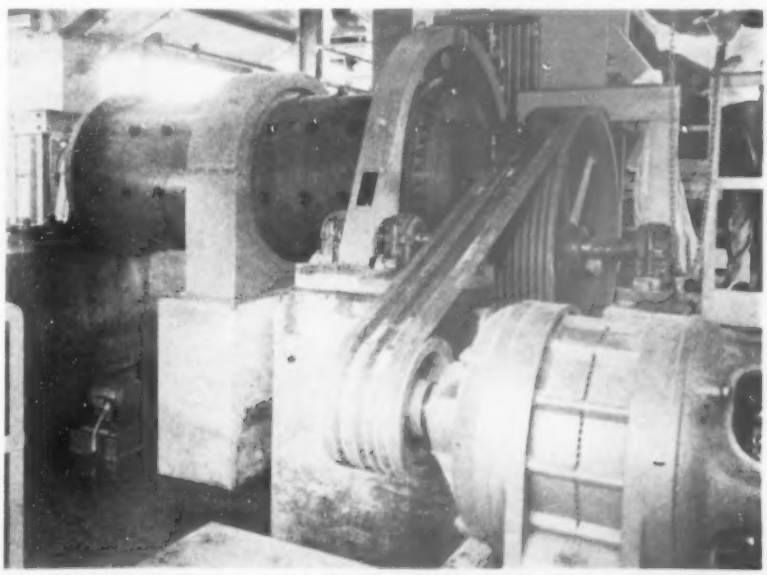
This plant is the only sizable commercial producer of river aggregates in the area. Its ratio of sand production has usually been sufficient to supply ready-mixed concrete producers and other concrete products manufacturers. However, an increased demand for sand has developed in recent years, due to growing demands for asphaltic concrete surfacing, concrete-lined steel pipe and other applications not requiring gravel.

The rod mill was installed to increase the production of sand by approximately 20 percent. It also serves as a control unit, to adjust the F.M. of plant-run sand, since the rod mill product is interblended with the natural sand. Adjustment of the rod mill product to compensate for variations in the F.M. of the natural sand permits holding to close tolerances in meeting rigid uniformity requirements.

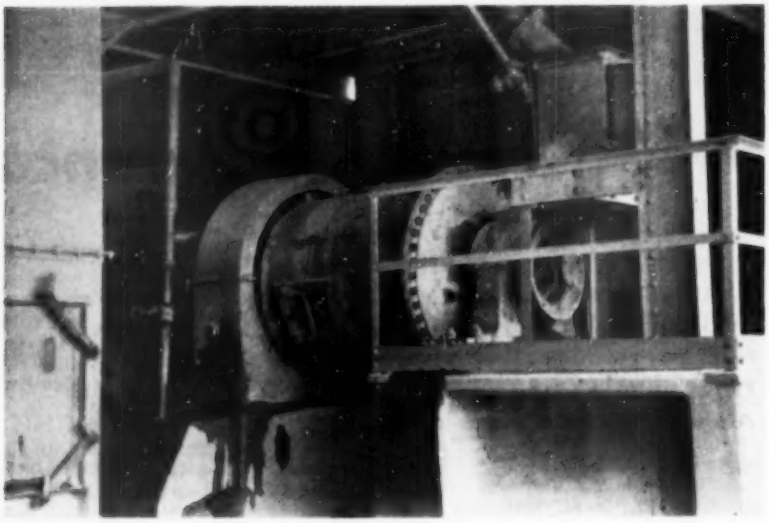
Plant Details

The plant has not undergone substantial basic change in many years, and was designed to produce one or two gravel sizes, pea gravel and concrete sand. It is located adjacent to the river and is largely a rail shipping plant. Shipments can also be made in barges loaded by belt conveyors, and by truck.

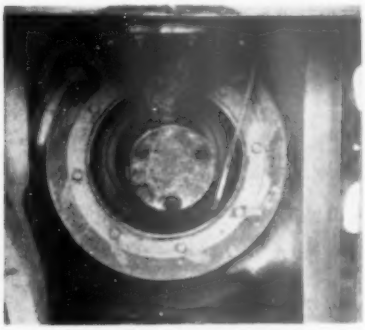
River-run material as excavated by ladder dredge is towed to the plant in barges of 400 to 600 tons capacity each. Tow-boats are diesel-powered,



Rod mill has double-end center feed and center peripheral discharge. It is 4 x 10 ft. and is driven through V-belt by a 75-hp. electric motor. A check on production is here being taken by diverting feed into a sack



View of rod mill showing feed into one end. An equal amount is fed into the opposite end



One end of mill, showing how feed is introduced through spout

and the usual practice is to tow four loaded barges per trip from the dredge.

A stiff-leg derrick swinging a 2-cu. yd. clamshell bucket empties the barges, dumping into a hopper above a vibrating scalping screen. A reciprocating feeder regulates flow from the hopper over the screen and the oversize, plus 2-in. gravel, is put through a 16-in. Allis-Chalmers Superior-McCully gyratory crusher. The crushed product, and the material by-passed through the vibrating screen, are transferred by a short belt conveyor to a continuous bucket elevator which elevates the material overhead to the sizing screens.

There are two pairs of Gilbert conical screens where wash water is applied, the flow from the elevator being divided equally to the first screens in each pair. The first pair is double-jacketed, taking off the sand sizes and the oversize gravel. Fines are dropped into two Stephens-Adamson automatic discharge sand tanks from which some of the 100-mesh fines are lost in the overflow. Oversize gravel is chuted below to a belt conveyor feeding a 4-ft. Symons short-head cone crusher. Product of this crusher is transferred by belt conveyor to the bucket elevator feeding the overhead screens. Pea gravel (¼ to ½ in.) is screened out through the second pair of screens, where coarse aggregate is also sized.

There are five rail-loading bins in a row paralleling the river, which support the screens, so that sized materials may be chuted directly into the bins. A 24-in. belt conveyor is the means of transfer to the far bin. When these bins fill up, the excess overflows into larger bins alongside at ground level from which a rail-mounted clamshell loads into cars, or the material may be withdrawn for stockpiling. The clamshell crane travels parallel to the bins and can transfer any of the sized materials into a hopper at one end for loading barges or trucks.

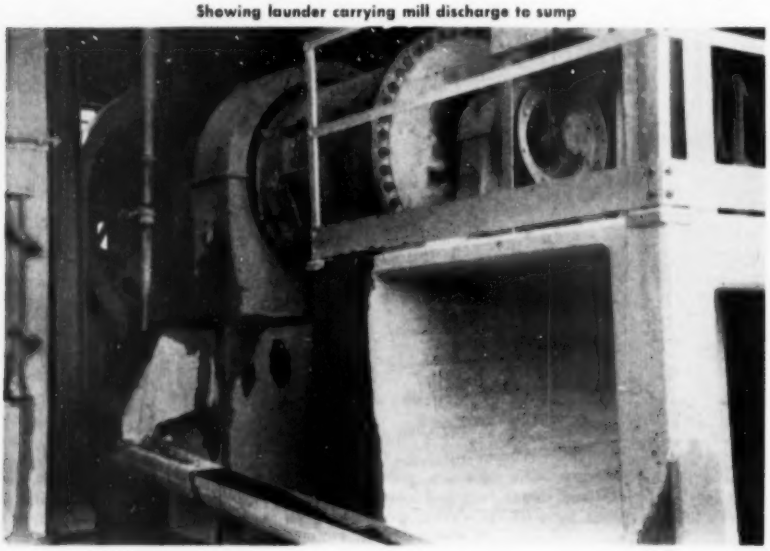
Pea gravel can be chuted in controlled amounts from either of the pair of screens (or both) into the large size gravel bin or, on the other side, into a pea gravel bin.

Normally, the bulk of gravel production is Tennessee highway No. 9 (1¼ to ¼ in.) which specification governs for the Tennessee highway department and for the Tennessee Valley Authority. At times a 2-in. paving gravel is produced and, on occasion, a ¾-in. product.

With a growing accumulation of excess pea gravel and abnormally large demand for sand, the company set out to grind the pea gravel into concrete sand.

A hammer mill was first tried but the maintenance expense, in the reduction of highly silicious gravel (92-93 percent SiO_2), was prohibitive. Crushing rolls would crack the gravel particles but did not produce fines. A rod mill was decided upon after studying their operation in granite-crushing plants and, based on these observations, one of small diameter, with feed into both ends and center dis-

Showing launder carrying mill discharge to sump



Closeup of mill discharge to launder. Overflow from sand tanks speeds flow





Vice-president C. Edson Hardy, left, with Superintendent A. T. Garner



Overall view of plant showing bins, overflow bins and loading crane. Rod mill building and Tennessee river are beyond

charge, was selected as the best type to prevent over-grinding.

Rod Mill Installation

The rod mill and related accessory equipment were installed in a separate small building erected for the purpose. It is at ground level, on the river side of the plant, and adjacent to the secondary crusher. Ground level is some 15 to 20 ft. above the river. The installation consists of two 16-in. belt conveyors to transfer pea gravel from its bin into the rod mill building, an overhead 35-ton steel bin for pea gravel within the rod mill building, two vibrating feeders, a chain bucket elevator to raise the material to be ground sufficiently high to spout it equally into both ends of the mill, the rod mill with its electrical control panel and a sump with 30-ft. lip just above the surface of the river where the barges are tied. Product of the rod mill is sluiced through a launder into this sump, which overflows into the river. As the sump fills with sand, the clamshell digs it out and the ground sand is spread over the unprocessed material in the barges so that it is inter-mixed with river-run material to be fed the plant hopper.

This is a very flexible arrangement of equipment and provides for straight feed of pea gravel, mixed feed of pea gravel with larger sizes in controlled proportions, or larger gravel up to 1½-in. maximum size may be fed the mill in the event there is sufficient pea gravel to provide an adequate feed.

A 16-in. belt conveyor transfers pea gravel from the plant bin to a second one filling the 35-ton feed bin. Push-buttons are provided at the top of the bin to start and stop these conveyors and the elevator feeding the rod mill. Pea gravel is drawn from the bin and fed at a controlled rate by Jeffrey-Traylor vibrating feeder into the feed elevator. A second feeder of the same type has been set up in relation to the cone crusher discharge hopper so that a controlled amount of the crushed oversize product may be diverted into

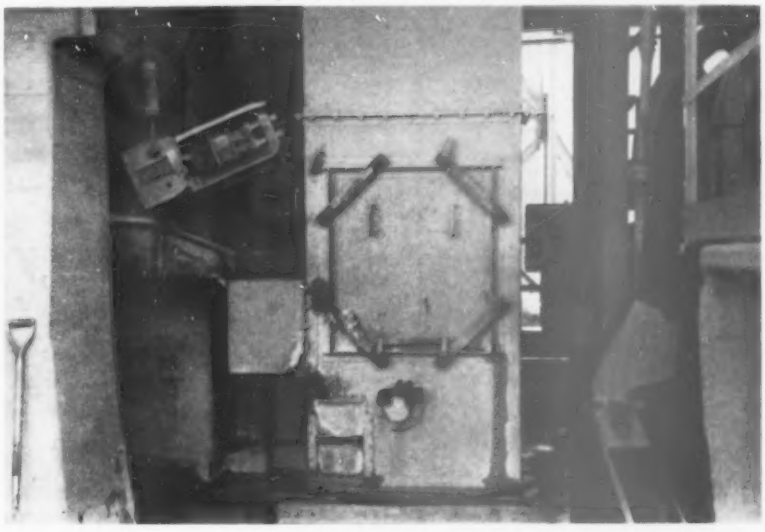


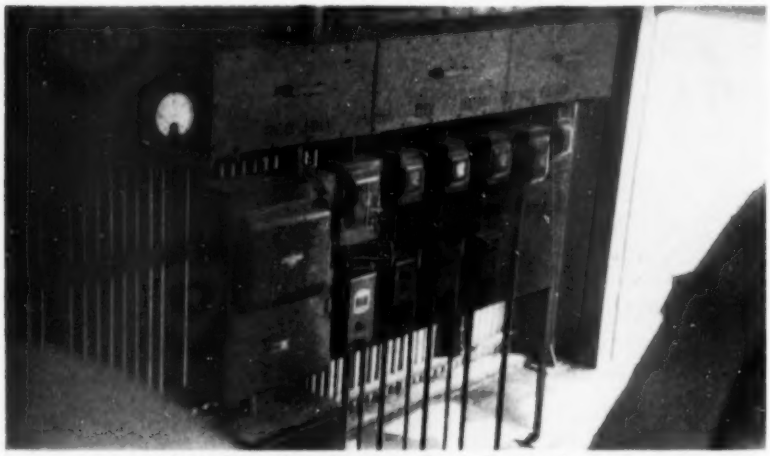
End view of plant showing arrangement of plant bins and overflow bins. Rod mill is to the left

Vibrating feeder for pea gravel. At right angles may be seen feeder for cone crusher product. Both discharge to common bucket elevator from which rod mill is fed



Feeder on left is for secondary crusher product. Mill with discharge launder is on right





Electrical control panel for rod mill and related equipment

the bucket elevator. At the head of the elevator the stream is split to two 5-in. pipe, with 45 deg. slope, one feeding into each end of the mill. Water is metered into each end of the mill.

The mill is a 4- x 10-ft. Allis-Chalmers unit with double-end feed and peripheral discharge at the center. The double-end type, of small diameter, was selected in order to hold retention time sufficiently low to prevent the tendency to overgrind. It is driven through V-belt by a 75-hp. G. E. induction motor (865 r.p.m.). Under full load the mill would be charged with nine tons of 3-in. rods 9 ft. 6 in. in length. Rods are of [high carbon] alloy (.90-1.10 specification) steel, heat treated and machine straightened.

Discharge from the mill is laundered to the sump, with water added in the discharge trough to facilitate the flow. This added water is overflow from the settling tanks in the main plant and carries some of the natural sand fines.

The rod mill will produce an average of 24 t.p.h. of sand (dry rate) under optimum conditions, according to data based on two years of experimentation and experience. Operation of the mill is regulated to yield a product as high as permissible in F.M. (coarse) and yet meet F.M. standards for the final product, which is a blend of about four parts natural sand to one of artificial sand. Under average conditions, fineness of its product will usually approximate that of the natural sand. Should dredging conditions in the river result in a natural sand deficient in fines, the mill will be adjusted to compensate and its production would then be somewhat lower.

Concrete sand specifications for the state of Tennessee and T.V.A. apply generally throughout the area, requiring an F.M. up to 3.0 maximum with tolerance of ± 0.1. The Tennessee specification requires that 5 to 30 percent pass a 48-mesh sieve and 0 to 5 percent be minus 100 mesh. T.V.A. uses a 50-mesh screen (5 to 30 percent passing) and has other minor variations. It is in meeting the uniformity requirements that the rod mill provides flexibility for control. The plant is shipping a product well within the limits of uniformity.

An accurate daily record is maintained for sieve analysis and F.M. of both the rod mill product and the finished blended product. A sample of the rod mill product is taken every 2 hr. from the discharge stream into the launder and sieve tests of the composite sample are run at the end of the day. This record is an indicator of what to anticipate the next day, based on past experience and performance.

(Continued on page 138)

DIXIE SAND AND GRAVEL CORPORATION

ROD MILL LOG SHEET

Date _____

TIME START	TIME STOP	HOURS RUN	FEED RATES NORTH END POUNDS	NORTH END TIME	NORTH END TPH	SOUTH END POUNDS	SOUTH END TIME	SOUTH END TPH	TOTAL TPH	WATER METER READING START	WATER METER READING STOP	CUBIC FEET	POUNDS	% OF SLURRY
TOTAL HRS RUN			TOTAL MILL FEED (TONS)							TOTAL WATER(LBS)				

TIME	SAND ANALYSES PER CENT RETAINED ON 4M	8M	14M	28M	48M	100M	F. M.

ROD WEIGHTS. 2" 102 Lbs. 3" 232 Lbs.

REMARKS _____

PRODUCTION

DAY _____ TONS

MONTH _____ TONS

Signed _____

OPERATOR

Rod mill log sheet gives detailed information regarding performance

St. Paul Quarries, Inc., near St. Paul, Ind., processing high-calcium chemical and metallurgical stone which meets all specifications for commercial aggregates and agstone



Shovel loading truck in reopened high-calcium limestone quarry

Crushing Plant Set-Up for Many Sizes

By WALTER B. LENHART

ONE OF THE NEWER CRUSHED STONE PLANTS to be established in the Mid-West is that of the St. Paul Quarries, Inc., St. Paul, Ind. St. Paul is about mid-way between Indianapolis and Cincinnati, Ohio. This new Indiana operation is an indirect development due to the construction of the Wolf Creek dam in Kentucky. After the dam was finished, most of the aggregate processing equipment used to supply material for the dam was moved to St. Paul. The plant was redesigned and reassembled to permit processing stone for commercial uses. New equipment was purchased as needed. The aggregate processing at Wolf Creek dam was described in ROCK PRODUCTS, December, 1948, page 102, with much of the published information built around the manufacture of sand from quarried material.

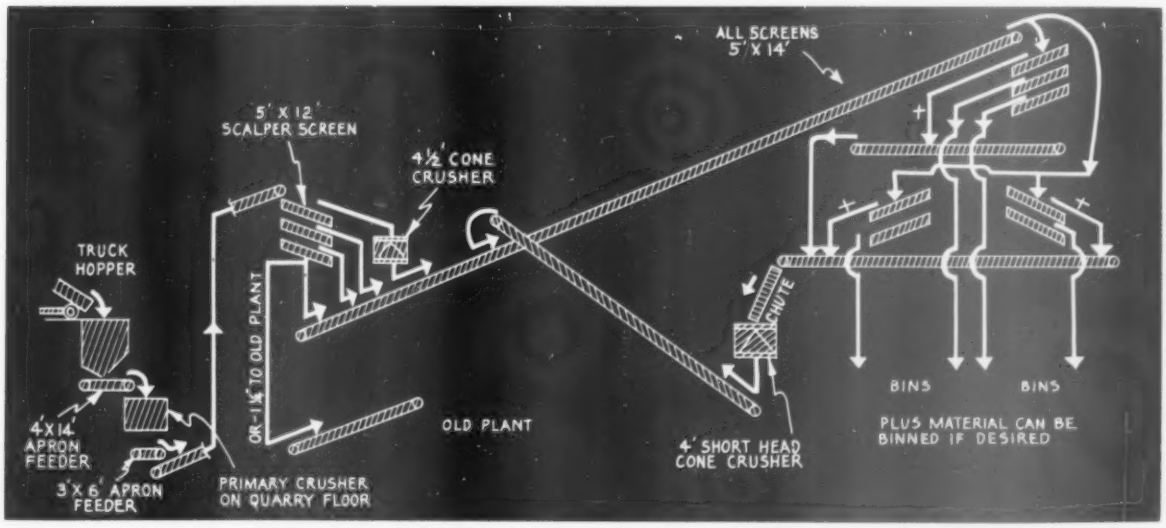
The quarry at St. Paul is a crystalline, high-calcium limestone suitable for chemical and metallurgical stone (97 percent $CaCO_3$). It is capable of meeting all specifications for commercial aggregates. It was formerly operated as the Wallace Fairbanks quarry, and some portions of the older plant are used at times to produce minus 1¼-in. road stone and/or agricultural limestone. This involves the use of a 4- x 10-ft. Pioneer three-deck screen and an Allis-Chalmers hammer mill. As the minus 1¼-in. is scalped out of the material from the primary crusher ahead of the secondary crusher, the cleaner stone goes for more exacting commercial uses. No difficulty was experienced in reopening the quarry as it is an agricultural district and provides employment to those living in the area.

Drilling and Blasting

As opened up, the quarry has a 34-ft. face with an additional 26 ft. of rock in the quarry floor. Little stripping is required, amounting from 6 in. to 2½ ft. of soil that is dozed back from the rim of the quarry. A 6-in. Keystone drill augmented by a wagon drill do the primary drilling. Atlas millisecond delays are used in blasting. Loading is with a 54-B, Bucyrus-Erie shovel with a 2½-cu. yd. bucket. It loads to 15-ton capacity, rear-dump Euclid trucks with a haul of about 500 ft. over easy grades as the primary crusher is located on the quarry floor.

Crushing and Screening

The primary crusher is a 30- x 42-in. Traylor jaw that is fed by a 4- x 14-ft. Traylor apron feeder driven through a Cleveland gear reduction unit. Immediately under the primary crusher is a 3½- x 10-ft. apron feeder which receives the impact of the crushed rock. The apron feeder serves a long 30-in. belt conveyor that takes the crushed stone to the scalper screen



Flowsheet of crushing, screening and storage facilities





Left: Two short horizontal belt conveyors over truck bins deliver oversize from scalper screen to cone crusher, to the left. Right: Three-deck scalping screen ahead of secondary cone crusher (not shown).

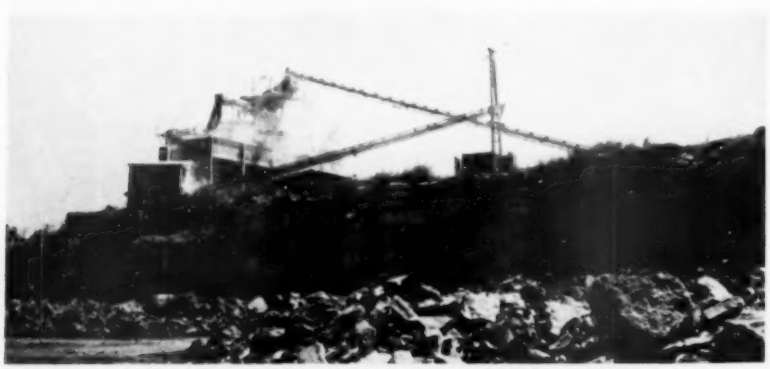
located on the rim of the pit. The belt assembly, for the most part, came from the Wolf Creek dam job.

The scalper screen is mounted near the top of four 8-in. steel pipes that act as supports. The screen is a 5- x 12-ft. Allis-Chalmers three-deck unit, operated dry. The plus fractions go by chute to a 4¼-ft. standard Symons cone crusher. Minus 1¼-in. material can be by-passed at this point and sent to the older plant now used for road stone or agstone, as previously mentioned. Throughs from the scalper and the cone crusher are moved by belt conveyor to the final screening plant, mounted over four steel truck loading bins. These screens are three Allis-Chalmers Ripl-Flo units. One has three decks and two are double decked; all operate dry and are 5 x 14 ft. Serving these screens are two short, horizontal-running belt conveyors that can receive the oversize from the screens and deliver it to a 4-ft. Symons short head mounted on the ground alongside the bins. The throughs from the cone are moved by belt conveyor back to the belt serving the main screening plant. The plant, which has been in operation about a year, has a capacity of 200 t.p.h., depending on stone sizes. The flowsheet gives the essentials of the material flow.

During the past summer a spur from the New York Central railroad was extended to a point about 2000 ft. from the plant. At that point, concrete bunkers were installed and a loading belt was provided so that carload shipments are being made. Ground-stored material is reclaimed by a 1½-cu. yd. P and H clamshell rig with a 2-cu. yd. No. 802, Lima shovel available.

The plant operates from purchased electric power, and all conduits are protected by placing them in steel pipe so that double protection is assured. Where the conduits are in flat areas around the plant they are buried deep enough so that traffic cannot damage the lines. In the pit, a larger primary crusher may later be installed ahead of the present unit to step up productioin and for better plant economies.

Edwin D. Kelb is president of the St. Paul Quarries, Inc. Mr. Kelb's father, Norman E. Kelb, is president of the Cumberland Quarries Inc., suppliers of aggregate for Wolf Creek dam, and is associated with his son in the new venture.



View of crushing and screening plant above old quarry floor

Maintenance Book

ANNOUNCEMENT of the publication of "Techniques of Plant Maintenance —1953," was recently made by Clapp & Poliak, Inc., New York, N.Y. The volume contains the text of 61 conference sessions on various aspects of maintenance and plant engineering, held in Cleveland, Ohio, last January. The 288-page book is available from Clapp & Poliak, 341 Madison Ave., New York 17, N.Y., for $6.00 per copy, postpaid. Those who attended the conference will receive a copy free of charge.

Highlight of the book is the publication of 859 questions and answers at the general and sectional conferences. Other questions and discussions, submitted at the 21 roundtables, are summarized in narrative style. Also included are the texts of 20 papers presented at the meetings. Illustrations include 41 charts. Those wishing to establish complete libraries may also obtain the earlier volumes for the years of 1950, 1951 and 1952.

●

CLEVELAND QUARRIES CO. has announced the removal of its general offices at Cleveland, Ohio, to its Amherst, Ohio, office location. The Amherst facilities have been enlarged to accommodate the merger.

This 105-Ft. Conveyor Does Tremendous Job on One Horsepower!



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"COMPACT" FEATURES

LESS POWER REQUIRED
(750-foot-tons per hour per H.P.)

LESS MAINTENANCE AND DOWN-TIME
(Less power + good design = good service)

NO DAMPENING UNDER LOAD
(Designed with extra power for specified load, with positive stroke)

MINIMUM SPACE REQUIREMENTS
(Over-all height of less than 13")

SCREENS, DEWATERS, SEPARATES, BLENDS, DRIES, COOLS
(Combines processing with conveying)

PROCESSING FEATURES AVAILABLE
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(Continuous smooth trough — no pockets)

WIDTHS FROM 6" TO 24"—LENGTHS FROM 5' TO 200'
(With integral pans of steel or other alloy metals, 12 gauge to ¼" plate, open or enclosed)

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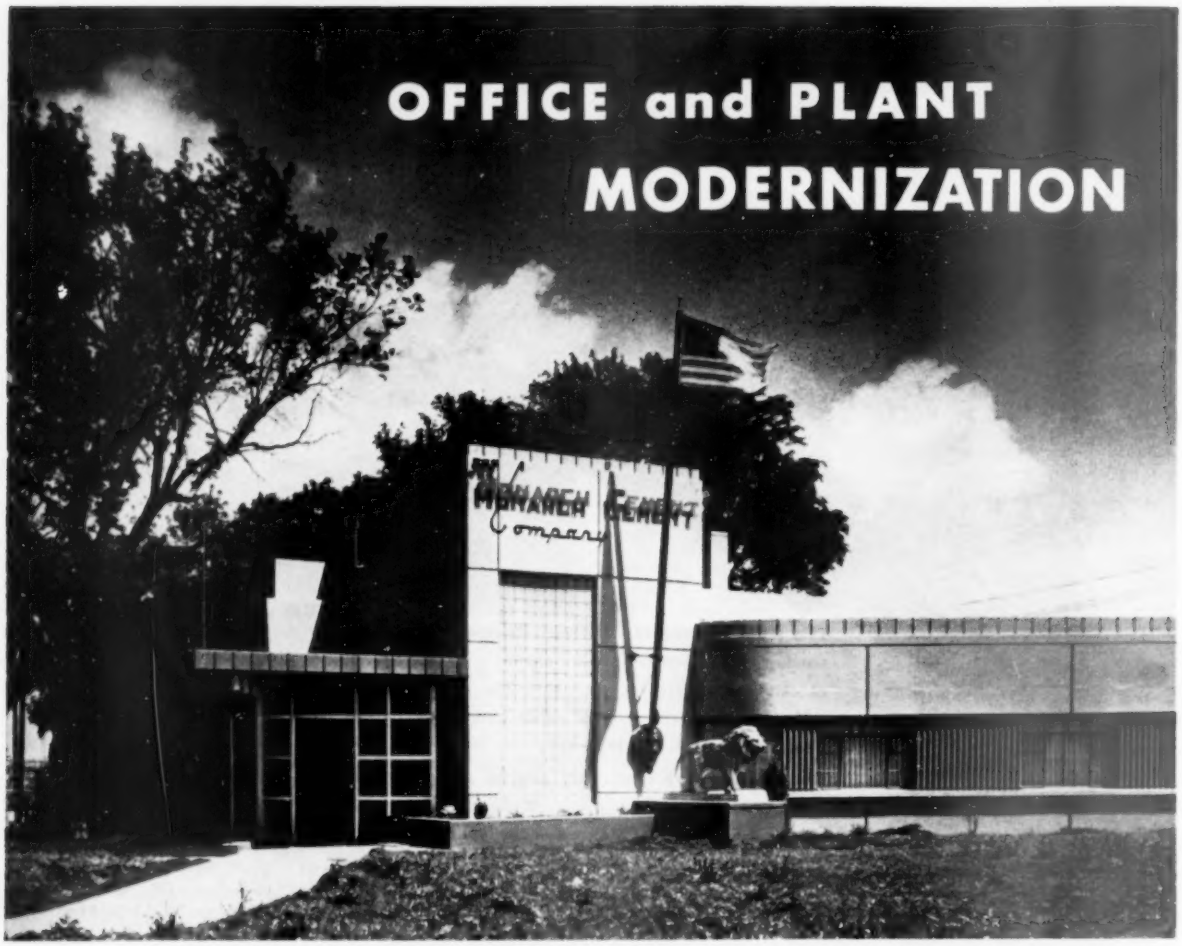
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OFFICE and PLANT MODERNIZATION



Office building modernization demonstrates the beauty of concrete as an exterior decorative material

By TIP BROWN

The Monarch Cement Co., Humboldt, Kan., has completely modernized its general office to make it one of the most attractive in the industry. Mill and power plant improvements increase efficiency

PICTURED HEREWITH are the results of a recent modernization program of The Monarch Cement Co. general office building at Humboldt, Kan. The piant, which is in Allen County in the Kansas gas belt district, is a single mill operation with long years of successful management in an area conspicuous for the number of cement plants. There are five plants in the immediate vicinity and one in northeast Oklahoma. Other neighboring plants include two at Kansas City, Mo.

The Monarch company appears to have achieved two commendable objectives in its expansion program. One demonstrates the unique beauty of concrete as an exterior decorative material in combination with glass blocks, transite, and well-chosen paint. Credit for excellent architectural designing should be given to Architect Garrold A. Griffin of Wichita, Kan. This is particularly evident in the details of the office entrance, the rustication of walls, effective indentation of the firm name, panel of glass blocks, flag staff, and the life-size lion, formed of concrete with a metallic coating and familiar as a trade-mark throughout the area served by the plant. The modern treatment of windows and walls has produced a very pleasing effect. The general contractor was The Mitchell Construction Co., Springfield, Mo.

Modern Office— Public Relations Asset

A second objective is the matter of a good front so that customers and the general public who might be in the vicinity could gain some notion of the progressiveness of the management. Time was when most any kind of a building that was weather proof was good enough for a cement mill office. Thinking has changed to the extent that the entrance to a plant may be easily converted into a silent but potent public relations asset. The Monarch people have gone even further by conducting a series of open houses where visitors are shown over the new office and then taken for a 2-hr. inspection trip of the mill and quarries. These are bread-breaking occasions, too, for lunches or dinners for the guests as occasion permits.

It should be told that the new office is only an addition to the building that has been in use for 45 years. Back in 1908, when the original office was built of monolithic concrete with a painted, exterior stucco coating, it was an eye-opener in advanced construction. As an example of permanence, it will continue to serve equally well as a back-drop for the new face-lifting operation. All that needed to be done was a bit of refinishing work and replacement of old type windows.

The interior reflects the best practices in insulation, lighting, air-conditioning, fire-safety, and conveniences, even to the point of a well-

Only the *BEST* would do..

Here are two cement plants in different parts of the world who chose KVS machinery and equipment because it best met their rigid specifications.

Wherever cement or lime producing machinery or mining equipment is used . . . anywhere in the world . . . you will find KVS tops the list of suppliers.

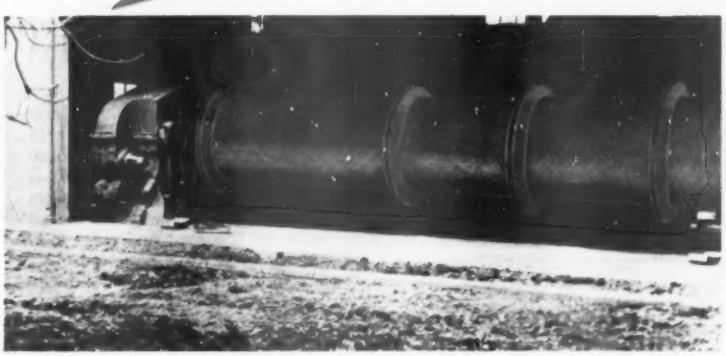
The reason is clear: KVS offers *so much more!* The name behind the product is what counts and KVS quality starts with the casting and goes right through to the finished products. For the *best* in crushing, mining, cement or lime machinery, look to Kennedy.

SEND FOR BULLETINS

Send for latest KVS Bulletin describing this equipment.

KENNEDY PRODUCTS

- **Gyratory Crusher**
- **Vibrating Screen**
- **Rock Feeder**
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7'x40', 3 compartment Tube Mill, with Integral Gear Drive, grinding clinker.



7'x70' Rotary Dryer

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MANUFACTURING & ENGINEERING CORPORATION

TWO PARK AVENUE, NEW YORK

***FACTORY* DANVILLE, PA.**





Left: Looking over the desk of President Walter Wulf. Right: A view of the attractively decorated conference room

equipped snack bar which is appropriately dubbed the "Lion" room.

Mill Improvements

While attracting less attention, but of high importance to the future of the company, a consistent program of mill improvement has been under way for several years. A major undertaking in 1950 was completion of the installation of a new 11- x 230-ft. rotary kiln, and a 4½- x 70-ft. air-quenching clinker cooler, supplied by Allis-Chalmers. Other improvements include: a Babcock & Wilcox waste heat boiler which generates 35,000 lb. of steam per hour at 400 p.s.i. and 750 deg. F. temperature; a Western Precipitation "Multiclone" dust collector; and a new 300-ft. concrete stack erected by the Custodis Construction Co. Stand-by steam power was obtained through a 40,000-lb. per hr. auxiliary Combustion Engineering Co. boiler placed in service at that time.

A duplicate of the 1950 kiln, clinker cooler, waste heat boiler, and dust collector installation was finished last year permitting abandonment of the old kiln and boiler sections in use for the past 45 years. On the same improvement schedule, a complete dust collection system was installed in the raw material dryer and grinding sections consisting of seven Norblo bag-type dust collectors.

The plant modernization program provides further for adding a new shale crushing and drying layout and a new power house with a 7500 kw. steam turbo-generator.

Executive officers of the company are Walter H. Wulf, president; Paul B. Fegely, assistant to the president; Frank L. Wachter, vice-president; Gerald E. Callaway, secretary-treasurer; and Miss A. M. Barrackman, assistant secretary-treasurer.

●

Hutt Sand, Gravel and Cement, Inc., Dayton, Ohio, has been incorporated by Harry L. Lawner, Chester E. Finn and Joseph A. Williams.

Letter to the Editor

GENTLEMEN: The article in the June issue of ROCK PRODUCTS, by C. M. Carman, entitled "Grinding Ball Classification," covering the use of special multicone liners to prevent reverse ball segregation in a cylindrical ball or tube mill, was very interesting to me, as it corroborates our findings during many years experience in ball milling. Only within the past few years have operators begun to realize that there is something to this reverse ball segregation in cylindrical mills and are interested in correcting the situation.

	Feed end		Center	Discharge End	
Ball Sizes		Av. Ball Dia.		Av. Ball Dia.	
Plus 2½ in.	37.3 percent	2 7/8 in.	22.0 percent	2 7/8 in.	61.2 percent
Plus 1½ in.	43.0 percent	1¾ in.	33.2 percent	1 1/4 in.	3.48 percent
Minus 1½ in.	19.7 percent	1¼ in.	44.8 percent	1 in.	4.0 percent

At Tennessee Copper Co., J. F. Myers, in 1946, reported the following condition in his 6- x 12-ft. trunnion overflow, cylindrical ball mill installation.

79.6 percent of plus ¾-in. balls at discharge end
49.0 percent of plus ¾-in. balls at center
38.9 percent of plus ¾-in. balls at feed end

In 1950, J. F. Myers reported that a test on his 11- x 3- x 6- x 10-ft. Tricone mill ball load showed 85.7 percent of the feed end volume composed of plus ¾-in. balls and 76.6 percent in the discharge. Reverse segregation was to a great degree prevented by the sloping barrel of the mill, even with such small balls.

W. I. Garms, assistant general manager, Kennecott Copper Corp., back in 1946, found reverse ball segregation in his 7- x 10-ft. cylindrical ball mill. He converted this mill to a modified tricone by installing special sloping liners. After this change he reported 72.4 percent of the plus 1½-in. balls at the feed end and only 43.3 percent at the discharge end. He reported a gain of 6 percent in mesh tons per horsepower after a year's test.

R. J. Mountjoy, mill superintendent at Castle Dome Mines, back in 1947, found the following condition in his 10½- x 11-ft. cylindrical grate discharge ball mill:

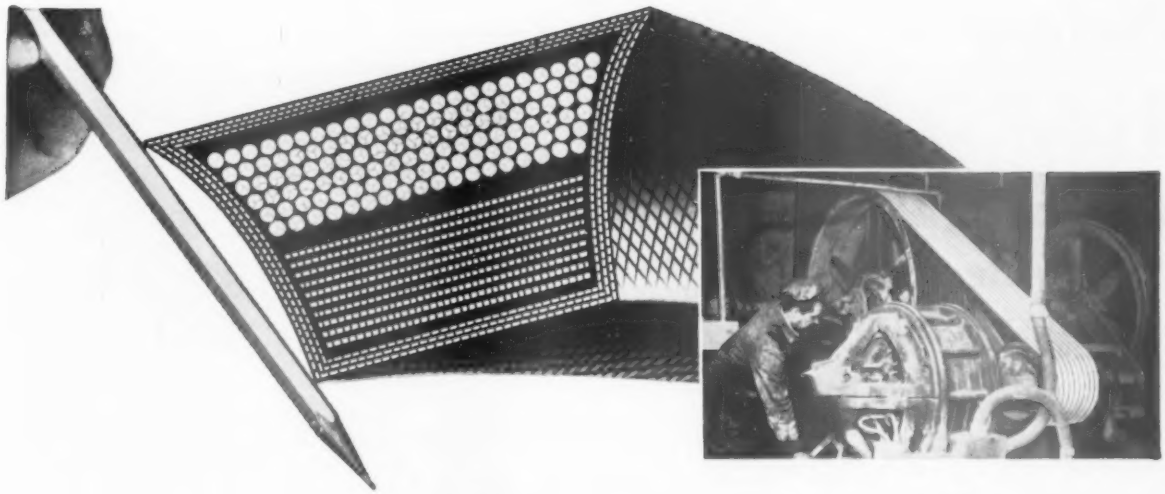
Reverse segregation in cylindrical mills is even greater when using a mixed charge with a proportion of large balls. At one cement plant in the Northwest, a 10- x 18-ft. ball mill, dry grinding limestone, was started at rated capacity, but after a few hours capacity began to drop. They opened the mill and found most of the large balls at the discharge end. Another cement operator in the Far West reported that he always found the large balls near the discharge end of his tube mills.

It is pure logic that if we get correct ball segregation in a mill, then for a given size of feed, it is possible to use a somewhat smaller average size of ball for correct grinding than would be the case if most of the large balls were at the discharge end and small balls at the feed end.

It is also a proven fact that the smaller the ball possible to be used, the higher the grinding efficiency and capacity for a given sized mill. A sloping barrel mill, like the Tricone, or one with sloping liners, keeps the balls where they belong.

The multicone liner is bound to result in higher wear due to the protruding ends and, when these ends are worn down, the classifying effect is nullified. They most certainly have a place in long mills, but for short length ball mills the slightly sloping barrel will simplify lining design and result in lower lining wear.

G. F. Metz
Hardinge Co., Inc.
York, Penn.

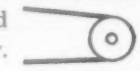


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If you want lower V-Belt costs, just make this simple test...pick up *any* V-Belt and bend it as if it were going around a pulley.

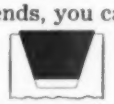




As the belt bends, grip its sides between your fingers and thumb.

If the belt has *straight sides*  you feel the sides bulge out.  This forces the sides of the belt to press *unevenly* against the V-pulley . . .  and you get concentrated wear at the points shown by the arrows.

Now, try this same test with the V-Belt that is built with CONCAVE SIDES  **—the Gates Vulco Rope.**

As this belt bends, you can feel the CONCAVE SIDES *fill out* and become perfectly straight. 

These sides press *evenly* against the V-pulley. All wear is distributed *uniformly* across the full width of the Gates Vulco Rope and the CONCAVE SIDES therefore mean longer belt life and lower V-Belt costs for you.

When you buy V-Belts, be sure to get the V-Belt with the CONCAVE SIDES—the Gates Vulco Rope!

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HARD HATS

Prove Their Value In Saving Lives and Preventing Injury

By PAUL C. ZIEMKE



Bulldozer pushing shale loosened by blasting. Men who work close to quarry face or places where falling rock or tools may be encountered should wear hard hats

SOME 400 YEARS AGO, the earliest known use of safety hats occurred when a Dominic Fontana required his workers to wear the armor steel warrior helmets of the day. Fontana was something of an early rigger foreman since he was in charge of an erecting job of considerable moment. He was erecting the Egyptian obelisk in the great plaza in front of St. Peter's cathedral in eternal Rome.

One can readily imagine the justified gripes of the workmen as they labored in the hot sun of the Italian summer under the burdensome weight of 4 lb. That excessive handicap is probably the reason for the long lapse of time between 1586 and 1919, when no record of safety head gear use appears.

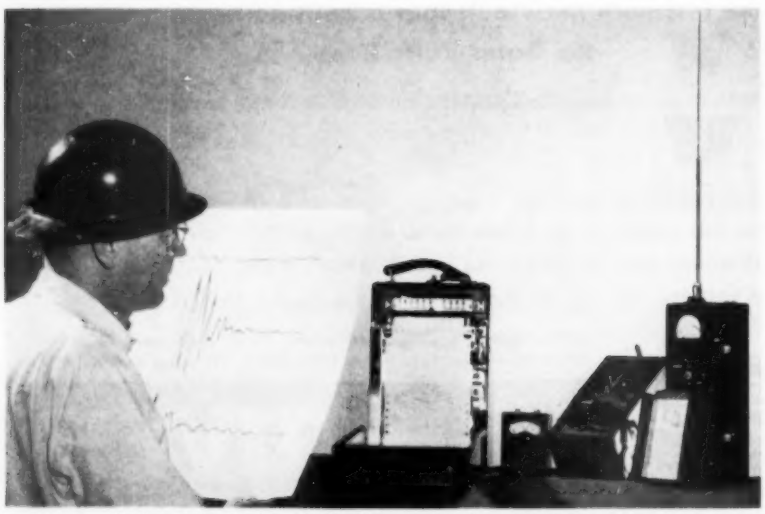
The appearance of the helmet in general use in World War I by all the armies pointed up the popularity of the "tin hat." Many men who brought them home as souvenirs put them to good use as safety head gear in the industries in which they worked. About that time the best the trade offered was a steel-framed affair with an oil-slicker type covering. It held its shape well, but it did little to protect the wearer from a really vicious blow. Other models were a fiber frame formed into a crown, brims added, covered with a skin of waterproof cloth, then treated with coats of asphalt paint to make it both waterproof and durable.

There followed a period of constant improvement to decrease weight and add strength. No longer was it considered good form to force the use of unwieldly head gear on reluctant workers. Insurance companies and safety engineers kept hat manufacturers busy on improved models that received ever widening acceptance. Such features as comfort, appearance, weight, size, long life and other factors influenced design and the materials chosen. No other workers, anywhere, had the benefit of such technical advances in protective headgear.

While the outer covering was no longer the big problem, there was still much to be desired in the inner construction where initially padding was inserted to break the blow of falling objects. This, of course, was most difficult to maintain in a sanitary manner. It was viciously hot in the glare of the summer sun or in the tepid depths of mines, and certainly difficult to keep securely in place. The tin hat had its serious drawback in that it conducted trolley wire current to the cranium of the user with altogether too much efficiency. The switch to fiber ended that problem and the advent of the inner hammock to provide shock-absorbing qualities and ventilation was a decided step forward.

With the introduction of the full-floating, hammock-head-band development, protective hat comfort took on a new meaning. The difference in comfort might be compared with the wearing of the derby and a well used felt hat. The crown became the outer shell, removed from the skull, that absorbed shock without transmitting the blow to the head and neck. The hammock solved the problem of hat sizes to a large degree since by the trick of lacing by stout cords various adjustments could be achieved. It also made it possible to remove the hammock with ease when spring clips were added to make possible the easy removal for washing or replacement. Finally, being mindful of the fact that not all workers labored in sunny climes, ear muffs for inclement weather were added to the unit.

The greatest progress in hat development came with the plastic era. While sheet fiber offered ample im-



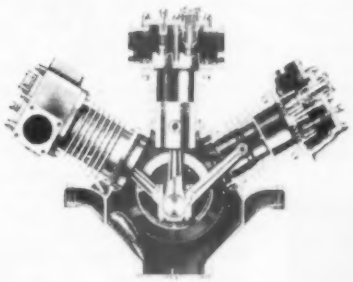
Author posing with earth vibration graph and recording instruments

How long since you checked your compressor's fuel consumption?

These figures will show you how Worthington Blue Brutes may save you as much as 1500 gallons of fuel during an average operating year

COMPRESSOR SIZE	ENGINE TYPE	GALLONS OF FUEL PER HOUR AT 80 PSI	GALLONS OF FUEL PER HOUR AT 100 PSI
60'	GASOLINE	1.31	1.42
105'	GASOLINE	2.16	2.35
	DIESEL	1.66	1.73
160'	GASOLINE	3.18	3.44
	DIESEL	2.45	2.60
210'	GASOLINE	4.32	4.70
	DIESEL	2.89	3.06
315'	GASOLINE	6.25	6.75
	DIESEL	4.38	4.64
600'	DIESEL	6.30	9.20

HOW DOES YOUR COMPRESSOR STACK UP in comparison with the Blue Brute for fuel economy? The figures shown have been determined under normal field operating conditions.



"SURE ARE EASY TO SERVICE." That's what we hear about Blue Brutes from mechanics all over the country. No special tools or complicated disassembly procedures are needed. And compressor uses same oil as engine.



PLENTY OF RESERVE HORSEPOWER is standard with the Blue Brutes. It takes thousands of hours of normal operation before engine wear affects the compressor's output. This means you get full-rated output even though the engine hasn't been in the shop for a long time.

Get the rest of the Blue Brute story from your nearest Worthington distributor. Or write to Worthington Corporation, Construction Equipment Division, Section H.3.5, Plainfield, N. J.

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Bureau of Mines engineer conducting a "drop" test on a modern protective cap

pact resistance, it broke down under the constant exposure to moisture. This was certainly bad for miners and others constantly exposed to dampness. Molded plastics solved the problem since they are completely waterproof, a non-conductor of electricity, and free of the annoying troubles of "drummyness" common to metal hats. They appear in an almost universal color—brown. The exceptions are in black. Miners' models carry a metal or fiber patch in the forward crown to attach the head lamp.

Plastics Appear

While the wide-brimmed hat was once the only model available, the demand for a rimless unit for those working in close quarters was soon answered. Two models are available today. The fluted unit was designed to offer a degree of ventilation without sacrificing compactness, and the non-fluted unit fits closely to the skull on the order of the freshman's "peanuts" cap. Wide-brimmed hats for men working in new underground developments where torrents of water are the order of the day will always be popular. Ice water down bare backs is no pleasure.

With everybody getting into the "act," improvements in safety head gear have been so frequent in the past few years, the federal specifications under the Procurements Division are rewritten every year. They now include resistance to impact, moisture and electricity, and the material must not support flame.

The "Glass Hat" Makes Its Debut

Safety hats of molded polyester resin and glass fiber are being successfully marketed by several manufacturers, among them, Bullard and the Mine Safety Appliance Co. The glass-fiber-polyester hardboiled hat has style. It is also cooler, due to the heat-deflecting, light colors, and low-heat conductivity of the material. Being available in six colors it lends itself to a series of uses heretofore considered quite another field out of the mining, quarrying and construction realm. Various crafts may be identified by distinctive colors, and the white models make for excellent identification where fog, smoke and gloom make visibility of a low order a serious factor.

For sheer brutal resistance to impacts, there is no equal to the glass fiber hat since it has more than passed the government requirements with flying colors. It passed the standard 40-ft.-lb. test (an 8-lb ball dropped 5 ft.) with regular monotony to encourage the manufacturer to rig up a 30-ft. drop of a 2-lb. tool. It took two to three drops to make a slight dent in the crown, which never was pierced. The prima donna of hats has fluorescent ingredients added to the resins. These hats are guaranteed to maintain a glow for eight hours, an additional and sometimes important safety feature in mines, dimly lit buildings above ground, and rescue work by emergency crews of municipal organizations.

High Impact Resistance

The standard drop test is 40 ft.-lb.; 80 ft.-lb. has been used on the modern types. In actual use, however, "No Injury Reports" have been made by safety directors when workers were struck by objects estimated to pack more than 200 ft.-lb. in their wallop.

Natural resiliency of the human body may account for absorbing-warding off- much of the blow. Involuntarily, the knees buckle and the body slumps with the blow. Just how much of the shock can be absorbed by a hard hat with a man under it cannot be accurately stated. But, according to reports, a 5-lb. valve dropped 60 ft. onto the safety hat of a worker- with no resulting injury, an impact 300 ft.-lb.

A few years ago, a hat that passed the standard drop test weighed more than a pound. Hats that pass twice that test today weigh less than a pound, or 12 to 13 ounces.



A glass fiber hat for use in close quarters

High Dielectric Strength

Dielectric strength has been increased even though the crowns are thinner. Molded glass fiber is a natural insulator and, because it has a strength-to-weight ratio in excess of steel, it needs no metal reinforcements. Where there is no danger of the wearer contacting electrical conductors, this is not a factor, and an all-metal hat is safe to wear. From the standpoint of comfort the radiation tests prove that the molded hat is cooler in direct sunlight. The difference ranges from 8 percent for brown hats to 12 percent for white hats.

The dielectric test leaves nothing to conjecture where the hat is immersed in a saturate solution of brine to within ½ in. of the rivets. Then the normally used primary voltage of 2300 volts of alternating current potential is impressed on the hat for a period of one minute, is then stepped up to 2800 volts if the first test is successful. That is about as hot an electrical exposure any man will care to contact.

Excellent Safety Factor

The experience of many companies is that protective head gear is preventing fatal as well as less serious accidents. One company is now mining four times as much coal per head injury as it did before it introduced safety hats. Another company reduced its compensation and medical cost due to head injuries approximately $7500 in four years time by the use of protective hats. It is generally found that as the number of safety hats increase at a mine the number of head injuries decrease. Protective head gear, to be sure, is no substitute for plenty of good timber. Head and scalp protection is a problem that probably concerns the miner more than any other worker but other crafts were quick to appreciate its many advantages.

The metal miner has a special liking for his hardboiled hat since for him, in many cases, much of the environment consists of high ceilinged stopes, drifts and raises where the "back" is always a threat, even though trimming and timbering play an important part in keeping the miner out of the hospital.

The vibrations of heavy, throbbing drilling machines coupled with the still heavier jar of blasting are serious factors in loosening over-head formations between "trimmings

(Continued on page 136)



4 Powerful Reasons Why CHEVROLET ADVANCE-DESIGN TRUCKS

work harder . . . work longer . . . work for less!

MORE POWER AT LOWER COST! You can look forward to sizeable savings on gasoline with Chevrolet trucks on the job. In heavy-duty models, the advanced Loadmaster engine with new high-compression ratio of 7.1 to 1 delivers more power than ever—and does it on less fuel! In light- and medium-duty models, Chevrolet's Thriftmaster engine combines top-notch performance, with rock-bottom operating cost.

TAILORED TO YOUR JOB! Of course you want a truck that fits the requirements of your particular job. And you get just that when you buy a Chevrolet truck! You get the *right* power . . . the *right* chassis units from tires to transmission. Chevrolet trucks are *factory-matched* to do your work at lowest cost!

RUGGED AND RELIABLE! These great 1953 Chevrolet Advance-Design trucks are built stronger to stay on your job longer! Frames, for example, are sturdier and more rigid. And you'll find extra strength in other vital places, too. The result is a truck that gives you extra miles and months of low-maintenance operation.

LOWEST PRICED LINE! You start saving money the moment you buy a Chevrolet truck. For, in addition to all its other advantages, Chevrolet is *America's lowest priced truck line!* Why not start saving *now!* Your Chevrolet Dealer will be happy to give you all the facts. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

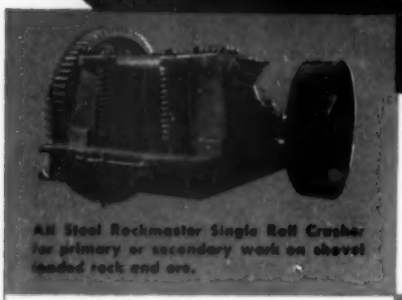
CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

TWO GREAT VALVE-IN-HEAD ENGINES—the Loadmaster or the Thriftmaster—to give you greater power per gallon, lower cost per load. **POWER-JET CARBURETOR**—for smooth, quick acceleration response. **DIAPHRAGM SPRING CLUTCH** — for easy-action engagement. **SYNCHRO-MESH TRANSMISSION**—for fast, smooth shifting. **HYPOID REAR AXLE**—for dependability and long life. **TORQUE-ACTION BRAKES**—on light-duty and medium-duty models and on front of heavy-duty models. **TWIN-ACTION REAR BRAKES**—on heavy-duty models. **DUAL-SHOE PARKING BRAKE**—for greater holding ability on heavy-duty models. **CAB SEAT**—with double deck springs for complete riding comfort. **VENTIPANES**—for improved cab ventilation. **WIDE-BASE WHEELS**—for increased tire mileage. **BALL-GEAR STEERING**—for easier handling. **UNIT-DESIGNED BODIES**—for greater load protection. **ADVANCE-DESIGN STYLING**—for increased comfort and modern appearance.

CHEVROLET first in demand in value in sales

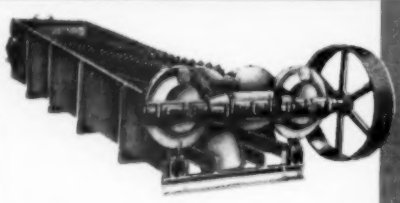
McLANAHAN

for dependable-low cost FEEDING, CRUSHING, CLEANING in

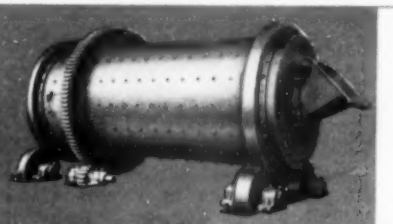


All Steel Rockmaster Single Roll Crusher for primary or secondary work on shovel loaded rock and ore.

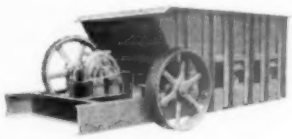
A pioneer in the development of many types of processing equipment, McLanahan has served domestic and foreign pits, mines and quarries for more than a century. Shown on this page are a few illustrations of McLanahan equipment for crushing, washing, sizing and conveying all types of ore, coal and rock. Technical details and price information will be sent upon request.



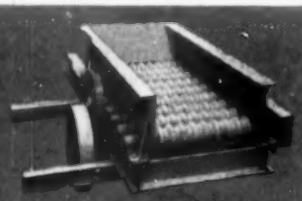
Log Washer for removing tough clay and soft rock from various materials.



Steel Paddle Mill Scrubber—high capacity for cleaning large size feed.



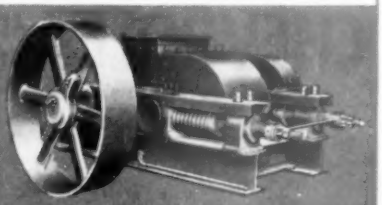
Heavy Duty Reciprocating Plate Feeder. Handles any material from sand sizes to shovel loaded rock and ore.



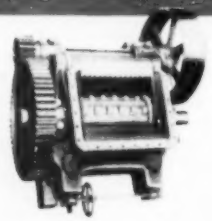
Live roll Grizzly for sizing and feeding various products.



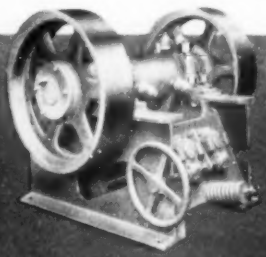
Double duty combination Scrubber and Sizing Screen for large and small capacities.



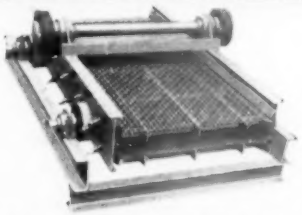
Heavy Duty Fabricated Block Diamond Double Roll Crusher for secondary reduction.



Automatic Steelstrut Crusher for primary and secondary work in small plants.



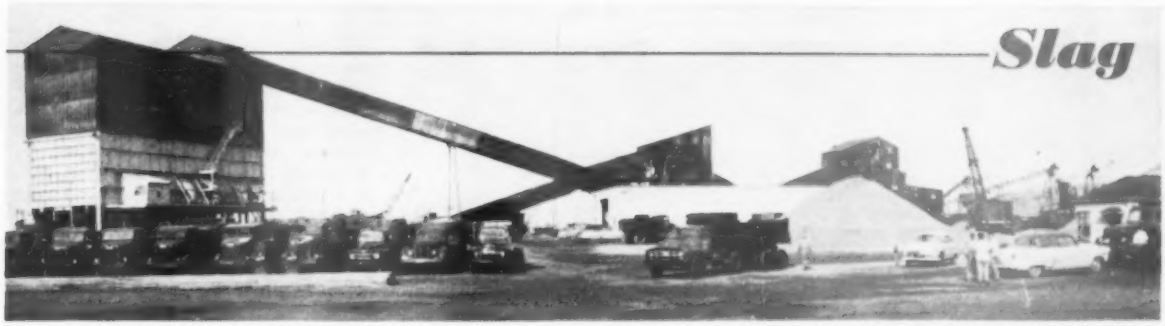
Fabricated Jaw Crusher for primary and secondary work.



Single and Double Deck Vibrating Screens in different sizes.

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Overall view of slag plant. From left to right: Screening plant with conveyor leading to finish screening plant and in foreground the conveyor leading from the pit to the primary crusher building; primary and secondary crusher buildings with finished open hearth slag conveyors in the background; warehouse is in front and scale house in right foreground

PROCESS 1000 TONS of Slag Per Hour

Edward C. Levy Co., Dearborn, Mich., one of the largest producers of slag aggregate in the United States, recovers large tonnage of metal before processing

By HUBERT C. PERSONS*

ONE THOUSAND TONS of blast furnace or open hearth slag per hour can be processed in the plant of the Edward C. Levy Co., Dearborn, Mich. This company is one of the largest producers of slag aggregate in the United States and the only one in Michigan. The five buildings and storage area occupy a 28-acre tract of land, and a second storage area of 45 acres also is available. Processing the slag output of two large steel plants involves the use of heavy crushing, screening, classifying and conveying equipment. The company employs a working force of 600 men and operates a fleet of 300 trucks, supplemented during busy periods by additional trucks under contract which have totalled up to 350 units. To insure gradation control of the output and to develop new uses for its product, the company also maintains its own physical and chemical laboratory.

*Industrial public relations consultant, Chicago, Ill., for many years manager, Public Relations Bureau, Portland Cement Association

The raw slag is purchased from the Great Lakes Steel Corp., in Ecorse, Mich., and from the Ford Motor Co.'s River Rouge steel mill. The slag comes to the Levy plant by truck and trailer in loads averaging 20 tons.

On arrival the slag is first dumped in separate piles as to source, on either side of the intake pit. A heavy bar grate grizzly with openings 12 x 16 in. to screen out oversize chunks, covers the intake pit. At this point the slag is hand picked to remove all apparent iron and is fed into the intake pit from either side by Caterpillar D-8 bulldozers. From the intake pit, the slag then passes over a magnetic separator at the No. 1 scalping screen where iron is removed before going to the primary crusher.

Plant Has Four Crushers

In addition to the 7-ft. Symons cone type primary crusher, the plant has two 4-ft. standard secondary crushers and one 4-ft. short head crusher. The primary and secondary crushers occupy separate buildings.

After leaving the primary crusher, the slag moves by belt conveyor to the secondary crusher building. Here it again passes over a magnetic separator to remove any remaining iron before it goes to the screen house.

The screen house is equipped with 12 sets of double deck vibrating screens. Seven of the screens are Allis-Chalmers Ripl-Flo and five are Kennedy-Van-Saun Type A. All screens are 5- x 12-ft. size.

Screening Plant

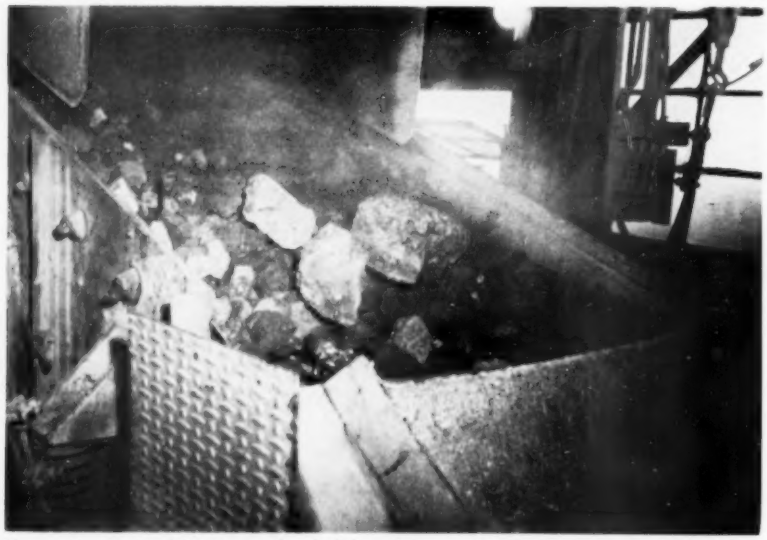
In the screen house, the slag is classified into various sizes from 2 in. down. The screen house also has a blending belt for combining various sizes of slag for all types of mixtures used in either concrete or bituminous work. Seven primary sizes and four blended sizes are made.

Open hearth slag is not treated in the same manner as the blast furnace





Left: Tractor equipped bulldozer pushing open hearth slag into feed hopper as magnet crane is preparing to pick up some steel scrap. Right: Stockpiles and loading cranes. At right is the approach to one of the big scales



Slag coming over scalping screen ahead of the primary crusher. To the right are control buttons with which all equipment in the building can be stopped or started

slag. The open hearth slag goes through a different routine. The secondary crushers are bypassed and the slag goes instead to a pair of screens which separate it into three sizes: 2 to 6 in.; 2 to ¾ in. and ¾ in. down. Open hearth slag is darker than blast furnace slag. It is said to be in demand for secondary roads, parking lots and driveways.

Reclamation of Metal

Reclamation of metal rates high in importance at the Levy plant. Approximately 80,000 tons of iron each year are recovered from the slag and returned to the steel mills. This is in the form of heavy melting scrap and small size iron.

Modern equipment and a precise system of weighing, checking and billing are applied to the delivery of slag aggregates. Trucks are loaded under the finish screening plant either directly from bins through bin gates or from a blending belt where two or more sizes may be blended to meet special requirements. The bins have a total capacity of about 3000 tons.

Scales Largest of Type

Trucks are dispatched from the scale house where each truck is weighed both light and loaded. Weighing is expedited by the use of two sets of scales, each with platforms 60 ft. long and 10 ft. wide. As the weighing is done, the scales, (Fairbanks-Morse Printomatic), turn out a printed slip showing the exact weight of the load. One of these scales has a capacity of 62½ tons. The other has a 50-ton capacity. A third scale with a capacity of 60 tons, is located in the stockpile area. These three scales are said to be among the largest ever built and it is believed that these scales are the most heavily travelled in the world with 2000 trucks weighed per day. A staff of seven men stationed in the scale house do all the weighing and operate the ticket writing and billing machines.

Plant Buildings

The principal plant buildings are the primary crusher building, secondary crusher building, screen house and bin storage building, scale house and slag plant office and the parts warehouse. The last named building is one of the most important parts of the plant for here are maintained spare screens and duplicate parts for vital plant machinery and equipment.

The plant laboratory, mentioned previously, is equipped with a 175-ton compression testing machine and all equipment necessary for making A.S.T.M. aggregate tests.

Besides being Michgan's largest producer of slag aggregate, the Edward C. Levy Co. operates an industrial contracting business, builds roads and does heavy moving and material hauling for the state of Michigan. Ralph M. Richards is general manager of the company's slag division.

Turkish Cement Plants

PLANS HAVE BEEN ANNOUNCED for the private financing of 16 new cement plants in Turkey, which has had a considerable increase in cement consumption in the past few years, due to intensified construction of new homes, ports and harbors, roads and bridges, airports, hydro-electric and irrigation projects. The present six Turkish cement plants are expected to produce about 1,000,000 tons of cement this year, but the estimated required consumption will be about 1,600,000 tons. The 16 new plants would have an aggregate capacity of 1,750,000 tons, which is expected to offset the present deficit and also take care of increased demand in the foreseeable future.

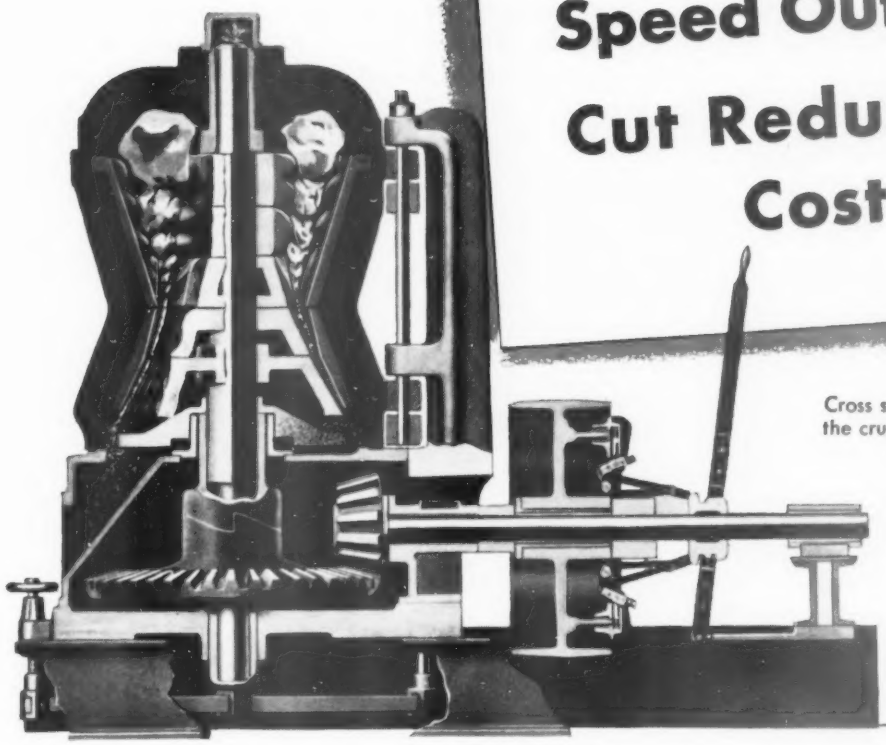
Lehigh Scholarship Grant

A gift of $20,000 by Lehigh Portland Cement Co., Allentown, Penn., for the establishment of a scholarship at Lafayette College, Easton, Penn., has been announced by Dr. Ralph C. Hutchinson, president of the college. The scholarship is one of several established by Lehigh. In announcing the grants, the company stated that it recognizes "the need of business and industry for the broadly trained men from which it can draw its professional, administrative and executive personnel," and that "this need can best be met through higher education offered in private schools of broad cultural background and with modern technical facilities."



Grizzly over intake pit. Magnet crane is lifting large piece of iron. Pile of iron previously removed by magnet crane is in foreground

Here's How to Speed Output... Cut Reduction Cost



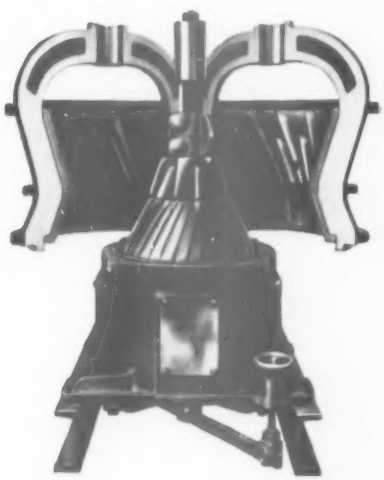
Cross section view illustrating the crushing action.

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Design Development of

CRUSHING CAVITIES

Studies of cone crusher cavity design have led to the development of liners for specific operations with resulting economies in power, maintenance, and wear

By H. M. ZOERB*

LINER WEAR IN CRUSHING CAVITIES of secondary and tertiary crushers can become an appreciable cost item when the material to be crushed is hard and abrasive. This item of cost not only includes the value of the crushing members, but also such more intangible costs as labor and lost production due to more frequent replacement.

The variables which are encountered in ores and minerals to be reduced, the design of plant and machine application, the sizes, shape and fineness characteristics of the crushed product; the moisture, hardness, friability, and abrasiveness of the material to be crushed—all are influencing factors which must be taken into consideration in the selection of a crusher, and particularly in the design of crushing cavity and liners to be used in a crusher.

*Administrative manager, Crusher & Process Machinery Divisions, Nordberg Mfg. Co. Abstract of paper presented before the A.I.M.E. meeting in Los Angeles, Calif.

Through a research program which was undertaken in cooperation with many operators of Symons cone crushers, a new approach to crusher cavity design was made which resulted in the development of liners for specific operations which showed—

(1) maximum utilization—as high as 70 percent to 80 percent of original weight of metal;

(2) maximum capacity of unit during the greater portion of its life.

Liners so designed for a given operation will show added economies in power consumption, maintenance and general wear and tear on the crushing unit.

Initial work in the so-called "tailoring" of crushing cavities was begun on the tertiary or fine crushing units where, as a rule, reduction ratios were low, varying from 3 to 6. Parallel or sizing zones in the lower portion of the crushing cavity were too long, resulting in a tendency to pack. It was found that very little additional crushing was done in the parallel zone after the initial impact in that zone and that a relatively small amount of additional crushing was done by attrition, which required very careful feed control. A small amount of over-feeding would result in packing which not only consumed power but caused unnecessary liner wear as well.

The illustrations show only contours of crushing cavities. It is that portion of the crusher encircled on Fig. "A." The portion encircled on the right is the cavity in its closed position and that portion encircled on the left is the open position. For purposes of simplification, we shall consider the cavities only in their closed position.

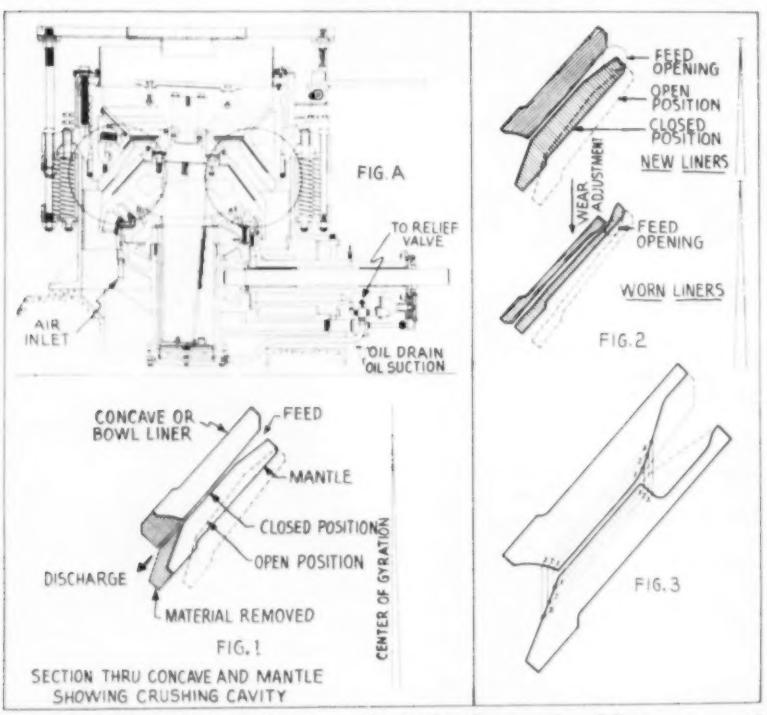


Fig. A: Cross section of cone crusher. Fig. 1: Showing how lower portion of liner was removed to reduce sizing zone to a minimum. Fig. 2: Progressive wear of the liner had the effect of lengthening the parallel zone until finally the entire crushing cavity was all parallel zone. Fig. 3: A radical change in contour was developed. Dotted lines show the original contour of the upper portion of the crushing cavity

Reduce Sizing Zone

The first step, therefore, was to reduce the sizing done to a minimum. This was done by removing the lower portion of the liner, Fig. 1. The result of the change was a saving of 15-20 percent in liner cost, less power consumption with no change in capacity.

This change in design, while an improvement, did not go far enough. As wear took place, the change in the liner was not uniform throughout its entire length, resulting in a restriction of the feed opening and thereby loss of capacity.

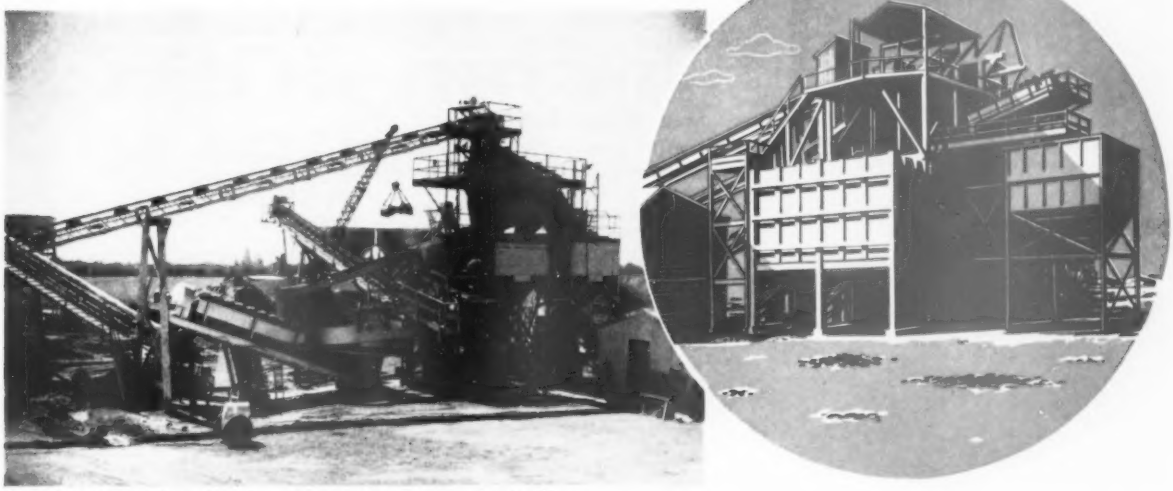
Furthermore, progressive wear of the liner had the effect of lengthening the parallel zone until finally the entire crushing cavity was all parallel zone, Fig. 2. It is obvious from the reduced feed opening of the worn liner that the ability of the machine to receive material is reduced considerably. Also, the long parallel zone with its worn, irregular profile did not operate at its highest efficiency.

The first attempt to overcome this difficulty was carried out on a 5½-ft. crusher installed in a plant producing roofing granules. The material being crushed was a very hard graywacke and the crusher was closed circuited with a screen having .232-in. slotted openings. A radical change in contour was developed, Fig. 3. The method of development of this contour follows: Equal wear lines on both concave and mantle are designated 1, 2,

(Continued on page 122)

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Cone Crusher Design

(Continued from page 120)

3, etc. Since adjustment for wear is vertical, corresponding intersections of wear lines and vertical lines developed concave and mantle contours which maintained equal but lengthening wear surfaces in the parallel zone. The ideal contour, of course, is one in which the length of the parallel zone remains constant but this is impossible due to present foundry practice and heat treating characteristics.

Liner Weight Cut Down

The dotted lines of Fig. 3 show the original contour of the upper portion of the crushing cavity. It may be of interest to note here that the weight of the liners as redesigned, was 2345 lb., or 32½ percent lighter than the original long liner, Fig. 1, and 15½ percent lighter than the conventional short type liners which have been widely used the past 10 years. This somewhat radical and unusual change in section on the mantle caused some concern as to performance, due to its possible feed restriction. Actual performance, however, indicated that these fears were unfounded. In fact, it proved to be an advantage since the rate of feed into the lower cavity was controlled, lessening the possibility of packing.

The result of the change is shown in Fig. 4. Solid lines show the worn sections of several contours superimposed upon the original. These contours were obtained by "torching" a section from the worn members and tracing the contour on a full size section of the original. It is to be noted that a surprising uniformity of wear was obtained. As nearly as can be ascertained, the hourly average capacity increased from 90 to 104½ t.p.h., or 16 percent, and the total average tons crushed per set of liners increased from 71,000 to 84,000 tons, or 18 percent . . . in spite of the fact that the liners were 15.6 percent lighter. The rate of liner consumption was .062 lb. per ton crushed as compared to .087 per ton crushed with the earlier design.

The possibility of this lighter design led to its adoption on other sizes of crushers with the following conclusions:

(1) Application should be confined to operations involving a relatively small apparent reduction ratio . . . approximately up to 4.

(2) In cases where the feed size was uniform on the top side, a reduction in capacity would be found.

This latter result was due to the restriction introduced by the ledge on the mantle, making the actual feed opening more sensitive to variation in the percentage of voids in the feed.

The obvious next step was to design a crushing cavity for a series of zones, each properly proportioned volumetrically, with proper distribution of metal, and that would produce an economical wear contour. Fig. 5 illustrates a cavity having three distinct crushing zones, each zone developed according to the method described in reference to Fig. 3. This type of cavity, while still in the tertiary stage of reduction, permitted a greater range of reduction and was less sensitive to feed characteristics insofar as it affected capacity. Furthermore, the volumetric proportion of each succeeding zone required a lower degree of feed control.

An important consideration in the design of a crushing cavity of any gyratory type crusher is the necessity of holding the angle of nip to a positive minimum. The use of the new cavity design permitted this; in fact, as can be seen from the illustrations, the angle of nip over the work range of the crushing stroke is almost zero.

The encouraging results obtained with the new type cavity on tertiary crushers prompted Nordberg Manufacturing Co. to apply the basic features in a broader way in the secondary crushing stage. Apparent reduction ratios are generally greater here than in the third stage, although the actual difference is not great. A 12-in. nominal size feed from a primary crusher will seldom have over 10 percent in the 10 to 12-in. size even when passed over a scalping device of rea-

(Continued on page 126)

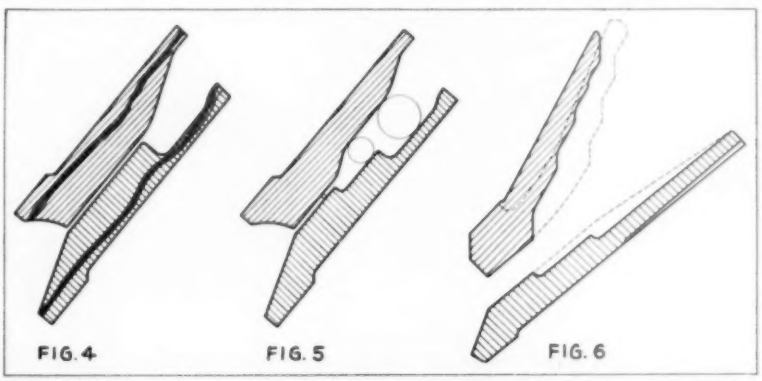


Fig. 4: Solid lines show the worn sections of several contours superimposed upon the original. Fig. 5: Illustrating a cavity having three distinct crushing zones. Fig. 6: By making the wearing members thicker where more work is accomplished and proportionately less where the wear is less, a higher percentage of liner utilization can be obtained

PAN CONVEYOR ROLLS FOR THREE YEARS ON ABK METAL WHEELS

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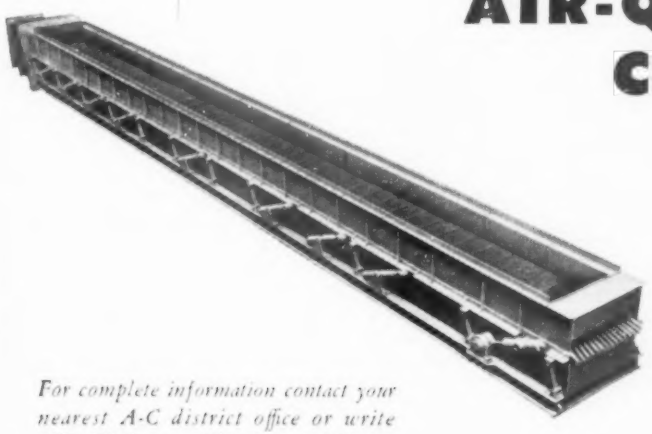


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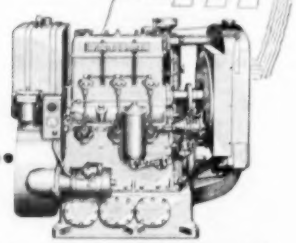
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Cone Crusher Design

(Continued from page 122)

sonable openings. As a general rule, the bulk of the feed size is concentrated in the range above the scalping screen to approximately 60 percent of the top size. A crusher receiving a 12-in. top size feed with a 1-in. setting would then have an apparent reduction ratio of 12, although actually it would more likely be eight or less. It is this greater percentage of material which must receive most attention in the design of cavity and that naturally, will be in the lower zones.

Larger Receiving Openings

By applying the same methods as outlined in Fig. 3 and by departing gradually from the parallel condition above the lower zone, it has been possible to provide large receiving openings in a given machine and yet stay well below maximum nip angles. Furthermore, by making the wearing members thicker where more work is accomplished and proportionately less where the wear is less, a higher percentage of liner utilization can be obtained, Fig. 6. A careful study of this problem resulted in a 7½-in. receiving opening on a 3-ft. crusher at 1-in. setting. This was formerly the receiving opening of a 4-ft. The 4¼-ft. machine can be supplied with a 12-in. opening, which is equivalent to a 5½-ft. crusher and a 5½-ft. cavity can be made with a receiving opening of 15 in., which is equivalent to a 7-ft. machine. The 7-ft. crusher formerly limited to 15 in. at 1¼-in. setting, now can have a feed opening of 18 in.

Heretofore, it has frequently been necessary to recommend oversize crushing units in order to meet feed size limitations, particularly in the case of low-tonnage operations. The redesign of cavities has permitted a better choice of crushing unit for the duty required, with lower first cost and more economical operation. The use of the so-called "controlled feed cavity" has enabled a large producer of limestone aggregate to standardize on two-stage crushing plants, producing all required sizes of aggregate except sand.

To date, more than 60 crushing units have been equipped with cavities embodying the features described herein. With few exceptions they have been very successful, the exceptions being largely those where a wide range of crushing is done with a single unit. It has been our experience that there is no one type of cavity which will apply to all crushing operations, even though the reduction ratio may be approximately the same. Two crushing units operating in different plants, on different material, effecting the same reduction, may result in entirely different wear contours.

In large-tonnage operations, where the product and tonnage requirements are fairly constant, operating economies can be made by "tailoring" the crushing cavity to suit that particular condition. If one can reduce liner wear only .02 of a lb. per ton crushed, a saving of approximately $75 per day can be made in a plant handling 10,000 tons.

Lime as Neutralizer

(Continued from page 93)

in order to expedite neutralization with dolomitic limes. It has been found that by adequate aeration, operation at 75 deg. C. or higher and by use of a five percent excess of lime, pickle liquor can be neutralized in less than one hour when using reactive dolomitic limes. This would make dolomitic lime competitive with high calcium lime.

In another example, a large enough excess of dolomitic lime was added to an acidic waste to raise the pH to 6.5 in two minutes but this was due only to reaction of the lime fraction and all the magnesium oxide component ended up in the sludge. This example was given to illustrate that excesses of dolomitic lime to speed up the reaction rate result in waste and undesirable sludge volume increases. The speaker said it was important to recognize that magnesium hydroxide is insoluble at pH 10.5 and higher.

Improper slaking can slow the reaction rate seriously, it was pointed out. Too much water for hydration drowns the lime whereas too little water burns it, both reducing its potential reactivity. Thus it is important that the optimum amount of water be determined by trial for different limes. A freshly slaked lime is more reactive than the same lime that has been dry-hydrated.

Emphasis was given to the importance of holding down cost of sludge disposal. Some limes produce more sludge than others. In average plants neutralizing sulfate liquors, dolomitic limes generally produce a larger sludge volume than high calcium limes of equivalent quality.

Neutralization techniques were briefly discussed. One of the mistakes is that many operators of neutralization plants do not consider all the facts and many do not even provide satisfactory agitation. Poor mixing can spoil all other potential gains. Modern practices were described. Mr. Hoak concluded by stressing the importance of continued research, particularly because of rapid progress being made in the field of stream pollution abatement.

Anti-Trust Suit Dismissed

ANTI-TRUST CHARGES against the cement industry are being dropped, as recently announced by Assistant Attorney General Barnes. Mr. Barnes stated that the government is withdrawing its suit because there have been "substantial changes" in the cement industry and its selling prices since 1945 when the Justice Department brought suit against 89 companies who were charged with conspiracy to fix prices.



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6

Labor Relations

(Continued from page 71)

cate that he was a highly unsatisfactory employe. Joseph Brown and Ed Jones, who were employes with Johnson in the press board department, testified that he was the type who would not do his fair share of the work, as long as he could place the burden on another. However, the principal fault which respondent found with Johnson's work was the fact that he talked too much. Five witnesses testified that Johnson was a habitual talker, that he would frequently wander off the job, and that his talking interfered with his work and that of others. Four witnesses testified that he was prone to leave his work to smoke in violation of respondent's shop rule. Johnson testified that he knew that the shop rule allowed smoking only on two rest periods and admitted that he would leave his work 'at other times' and take a smoke. The following excerpt from his testimony is also corroborative of the fact that he talked too much.

"'Q. Well, you like to talk quite a bit, don't you?

"'A. Yes, sir, when God turns a man loose, he's going to talk. You take a man don't talk, he ain't got no religion.

"'Q. You talk to them all the time:

"'A. Yes, sir, when the spirit hit me. I'm going to talk.

"'Q. The spirit hits you whether you are working for the United States Gypsum Company or whether you are some place else, doesn't it?

"'A. Anywhere. He said, 'Go preach My Word and Carry the Gospel.' He pay me at the end, and that's what I'm waiting for.

"'Q. You did a lot of talking while you were on the job?

"'A. Oh, yes, I talked on the job.'

"In so far as Pearson and Johnson are concerned, this is not the familiar case where an employer discharges or refuses to rehire those most prominent in union activities. On the contrary, there was no direct evidence of any union activities whatsoever by Pearson. The only evidence of union activity by Johnson was his own testimony that he sometimes opened the union meetings with a prayer. Neither of these two men appear to have been more prominent than fellow employes who were also casual members of the union and the record fails to disclose any possible reason why they should be singled out for discriminatory treatment on the basis of union membership or activities. On the other hand, their work performances were such as to afford a good reason for respondent's action. We think it is clear that respondent's avowed reason for its action was the real reason. It bears the unmistakable ring of truth.

Failure to Recall

"Hiram Peoples was hired by respondent in September, 1946, as a general laborer in the fabricating department at respondent's Greenville, Miss., plant. After a period of doing odd jobs, he was assigned to operating the power-saw in the fabricating department. Respondent's fabricating and shipping superintendent, Neyman, and its general foreman, Youngberg, both testified that People's performance on the cut-off saw was good; that he came to work regularly and was an agreeable, dependable workman. He was also financial secretary of the local union, and respondent was well aware of the fact.

"Respondent seeks to attribute its failure to recall Peoples to the fact that he was not a versatile workman and did poor work on many of the jobs other than the power-saw. Some of this may have been due, as petitioner contends, to respondent's failure to leave him on such other jobs for a long enough period of time to afford an opportunity to develop the requisite skill. Be that as it may, it is clear that Peoples' physical limitations were such that when the reduction in force on February 5, 1949, was necessitated by falling production, respondent was fully justified in laying off Peoples as during such period the power-saw was to be used only intermittently, thus requiring the power-saw operator to spend much of the time at other jobs for which Peoples' physical stature did not well qualify him. However, this does not adequately explain why respondent failed to recall Hiram Peoples when production picked up to such extent that it ended the period March 15, to July 31, with more employes in the fabricating department where Peoples worked, than it had before the layoffs necessitated by falling production in the first quarter of the year. The question is a close one but after carefully considering all of the evidence and bearing in mind that this court is not here to try the case de novo, we are of the opinion there is substantial evidence to support the Board's inference of fact that the failure to recall Peoples was due to his membership in and activities on behalf of the union.

"As for the Board's finding that respondent unlawfully interrogated and coerced its employes, we think it is clear that the evidence fully supports the Board on this issue. It is true, as contended by respondent, that an employer may express any views or opinion but only if such expression contains no threat of reprisal or force, or promise of benefit. Suffice it to say, we agree with the Board's findings that respondent's expressions of opinion went beyond that which is permitted.

Noncomplying Local

"Finally, respondent has filed a motion in this court for leave to adduce additional evidence with respect to the organization and existence on June 1, 1950 and thereafter of a local union chartered by the International Woodworkers of America to represent

(Continued on page 130)



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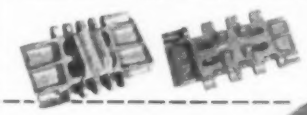
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Labor Relations

(Continued from page 128)

the employes at its Greenville plant; and with respect to the failure of such local to comply with subsections 9(f), (g) and (h) of the National Labor Relations Act, as amended by the Labor Management Relations Act, 1947, § 101. Section 9(h) of the Act provides in part that no complaint shall be issued pursuant to a charge filed by a labor organization unless there is on file with the Board an affidavit executed by each officer of such labor organization and the officers of any national or international of which it is an affiliate that he is not a member of the Communist party. The record discloses that the International Woodworkers of America, C.I.O., was certified as exclusive bargaining representative at the plant in question on September 27, 1948. This union was the charging party. Respondent apparently concedes that the charging party, the International Woodworkers of America, and the affiliated C.I.O. were in full compliance with the Act at the time the complaint issued and seeks only to adduce additional evidence to show that after the complaint issued and after the hearing in this case a local was organized at the Greenville plant and a charter was issued to it by the International Woodworkers as Local Union No. 96. Respondent claims that such local did not comply with the provisions of the Act.

"We agree with respondent's argument that the benefit of the Act may not flow to a noncomplying labor organization but we fail to see how the argument is here applicable. The instant case does not involve a refusal to bargain and, since Local 96 was concededly not in existence when the complaint issued on April 17, 1950, it could not possibly have been in compliance at that time. Under these circumstances, we think the date the complaint issued was the crucial time under section 9(h). N.L.R.B. v. Dant, 344 U.S. 375. Therefore, since respondent seeks by its motion to adduce additional evidence relating to the compliance or noncompliance of a local which was not in existence until after the issuance of the complaint, we fail to see how the evidence would be material to any issue before this court. The motion is denied.

"The petition of the Board for enforcement of the orders will be granted except as to that part of paragraph 2, subdivision (b) requiring respondent to reinstate Pearson and Johnson and (c) requiring them to be made whole. As to that part, it will be denied."

New Face on N.L.R.B.

The membership of the National Labor Relations Board under the two previous administrations has generally been conceded to be pro-labor, and at times actually Communistic. Consequently, employers can now breathe a sigh of relief that one new member, at least, will act for the public interest above all other considerations. He is Philip R. Rodgers, a native of Utah, who in taking his oath of office said:

"I accept this appointment fully cognizant of the grave responsibilities which it involves. I undertake these responsibilities with an abiding sense of humility.

"I do not wish to convey the impression, however, that my humility bespeaks any lack of knowledge as to what my responsibilities are, or any indecision as to the attitude with which I intend to approach those responsibilities.

"I take this position as the representative of no individual or no group, other than the people of the United States. To each petitioner under this act, whether he represents labor, management, or an individual, I propose to extend his full rights, and nothing more.

"I propose to carry out this law, not as it once was, not as some may wish it to be, but as it is. In other words, I intend to adhere to the Taft-Hartley act as it stands and to apply it as Congress in its wisdom intended it to be applied.

"If any individual or group feels that this act requires modification, let him look to the Congress of the United States to effect those modifications, and not to this agency. I propose neither to subvert the intent of Congress nor to usurp its lawmaking



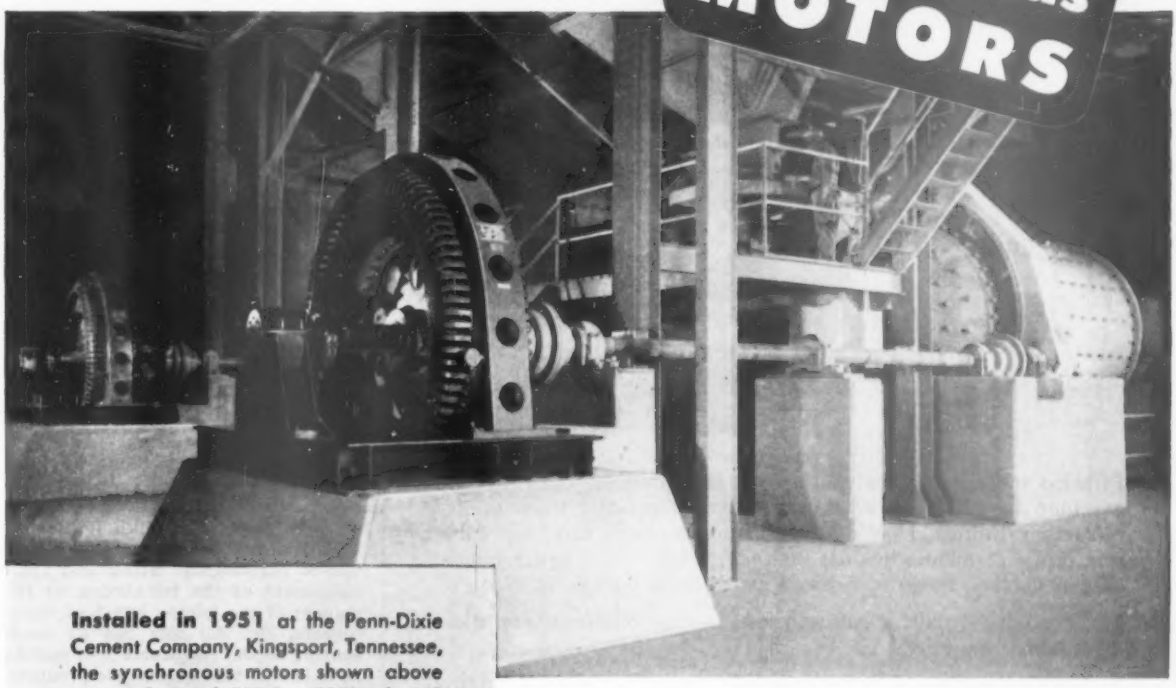
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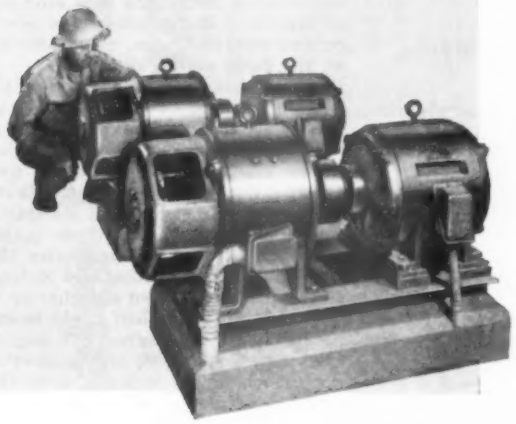
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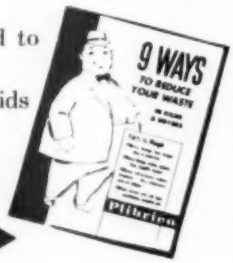
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functions through the decisional or administrative processes of this board.

"Indeed, it is my belief that those who feel impelled to work only on behalf of one faction or another, rather than in the public interest, in this or any other field of government activity, should not presume to wear the cloak of the impartial public servant.

"I propose also to give full recognition and effect to the decisions rendered by the courts in this important area of public policy, with no attempt on my part to avoid, restrict, or circumscribe the intent or impact of such decisions. In the American scheme of things this agency is, necessarily, mere creature of the Congress and a subject of the courts. It is not my intention to attempt to place this agency outside its proper constitutional context.

"In embarking upon these new responsibilities, I ask the help of Almighty God, and all those who believe in equal justice under law and the American system of constitutional government."

Rocky's Notes

(Continued from page 69)

lite, and vitreous silica. Some of these changes are merely distortions of the quartz lattice structure as composed of closely connected silica tetrahedra (SiO_4), but others are complete breakups of the original lattice and rearrangement of the tetrahedra, or the manner of the joining by edges, sides, corners, etc. All this has as much bearing on the manufacture of cement as it has on that of ceramic products. If the silica used in a cement raw mix happens to be in one of the low gravity forms like tridymite or cristobalite, it already has a partly open lattice structure which much more readily reacts with the ions of lime or calcium. Quartz is more readily converted into these forms by the presence of impurities, particularly the alkalies. Hence, the heat economy of cement manufacture is, as every cement chemist knows, much affected by the form of the silica.

Less is known about the possible transformations of silica that may take place during the hydration of the cement, if any. The kind of silica in the clinker may not be too well known. For example, Prof. Hauth says: "The sluggishness of the transformation between the three major forms of silica also complicates the various forms on heating and cooling. When quartz is heated its behavior is somewhat different than might be expected. In the range from 870 deg. to 1470 deg. C. the type of transformation which occurs depends upon the presence or absence of a flux. In the pure dry state the formation of tridymite directly usually does not occur. Instead the quartz transforms to cristobalite and this inverts to tridymite. The reason for the transformation of the unstable intermediate phase is not clear, although it may be linked with

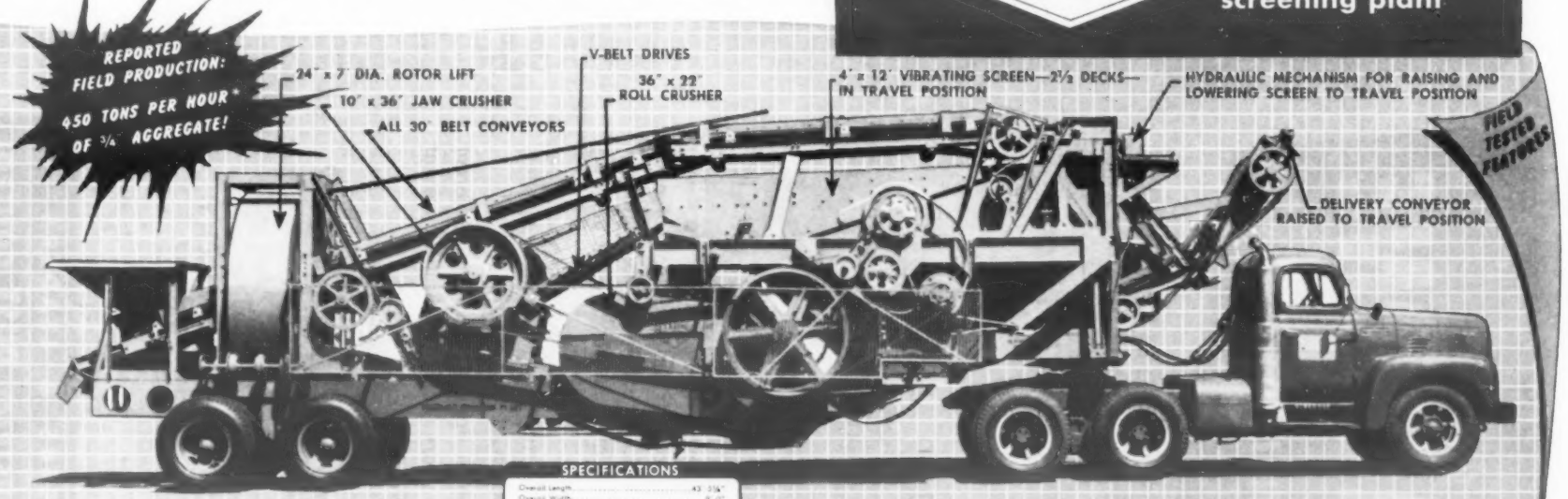
Greater Production...

with the new "ALL AMERICAN"

DIAMOND

"77" portable crushing and screening plant

REPORTED FIELD PRODUCTION: 450 TONS PER HOUR* OF ¾" AGGREGATE!





"Worth Waiting For!" Says Howard Ganley!

Howard Ganley Inc., General Contractor, on the job relocating state Highway 65 just south of Minneapolis is producing 400 tons per hour of aggregate from a pit containing 25% to 55% material to be crushed!



"We're Sold On The '77'!"

Northwest Sand & Gravel Co. of Virginia, Minn., reports production of 250 tons per hour of ¾" minus aggregate in 55% crush of extremely hard rock!

* LaVos & Scheffler of Fargo, North Dakota, is producing up to 450 tons per hour of ¾" minus aggregate in 25-55% crush!

SPECIFICATIONS

Overall Length	43' 5½"
Overall Width	9' 0"
Overall Height (Operating)	13' 2¾"
Overall Height (Travel)	12' 8"
Travel Weight (Approx.)	84,000 lbs.
H.P. Required (See Detail)	130-160 H.P.
Wheelbase	20'-11" With Tandem Dolly
Number Of Front Wheels (Optional)	4 Dual Wheels—8.9x20—12 Ply Tires
Number Of Rear Wheels	4 Dual Wheels—8.9x20—12 Ply Tires
Jaw Crusher	10" x 36" (Roller Bearing)
Roll Crusher	36" x 22" (Star Gear—Roller Bearing)
Vibrating Screen (Set at 18°)	4' x 12'—2½ Deck
Rotor Lift Drum	24" x 7' Dia.
Belt Conveyors	All 30" Wide
Screen Lowering Mechanism	Hydraulically Operated
Drives	V Belt
Spline Shaft Drive from Power Unit at Side of Plant	
Capacity	175-225 Cu. Yds. Per Hr. (Based on 25% Oversize Material Passing 1" Screen)

OPTIONAL EQUIPMENT

1. Single or Double Axle Front Dolly
2. Sand Reactor
3. Chip Elimin[illegible]
4. Mechanical, Air, or Vacuum Brakes on Four Rear Wheels
5. Belt Combined Swivel Field Conveyor
6. Truck Loading Hopper with Plate Feeder and Grizzly

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The Industry said it couldn't be done!

They challenged Diamond to produce a portable crushing and screening plant that could out-produce anything capable of crushing and traveling on America's highways. Diamond has met their challenge with the new "77"—the *only portable plant* offering *you* so many outstanding features. It's truly an "All American!"

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Please send me complete details on the new "All American" "77" Diamond Portable Crushing and Screening Plant.

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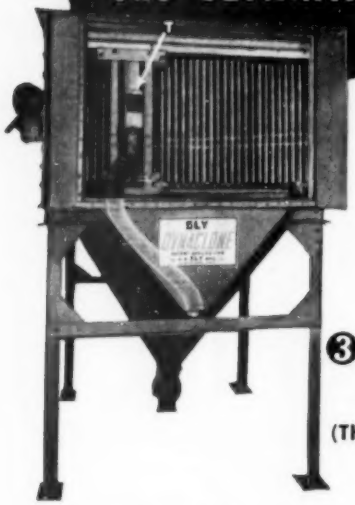
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FOR CONTINUOUS OPERATION

❸ NO AUXILIARY MOTORS OR BLOWERS
(THE MAIN OPERATING FAN DOES THE CLEANING)

❹ NO ABRASION OF BAGS BY THE CLEANER

The traveler (T) is open to atmosphere by means of a 4-inch flexible hose. As the traveler contacts the open end of each bag, the negative pressure which exists in the dust chamber draws a blast of air (from the atmosphere) through the bag to thoroughly clean it.

Each bag is cleaned, on an average, once every five minutes, thereby assuring uniform suction at dust sources.

The Dynaclone has now been in operation in many different industries for the past three years. More than half of present orders are from the same customers.

SEND FOR BULLETIN . . .



NO. 102

THE W. W. SLY MFG. COMPANY
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Detroit • Buffalo • Cincinnati • St. Louis •
Minneapolis • Birmingham • Los Angeles • Toronto

SLY PIONEERS & LEADERS in INDUSTRIAL DUST CONTROL

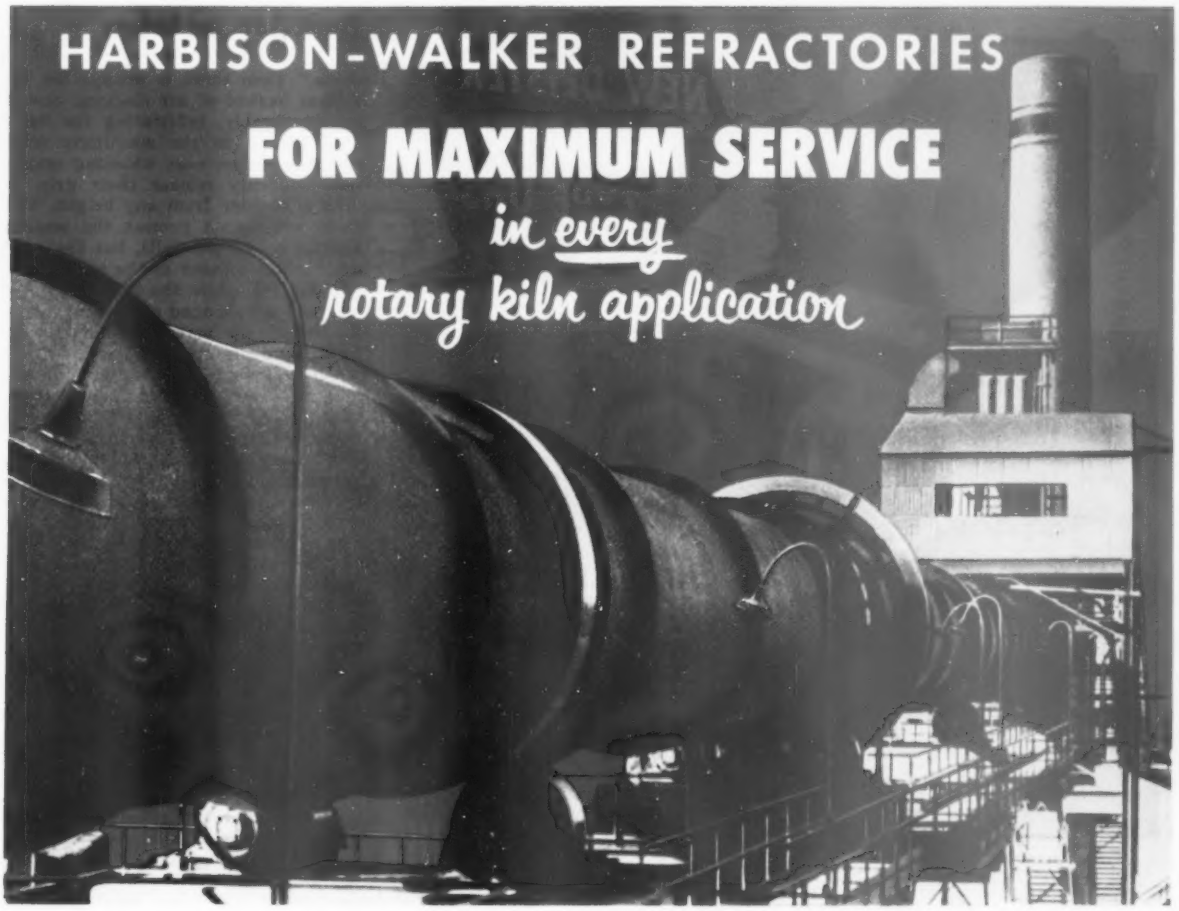
the slightly higher density of cristobalite as compared to tridymite. In the presence of a flux, quartz may transform directly to tridymite. Above 1470 deg. C. quartz transforms directly to cristobalite; however, on cooling cristobalite will not invert directly to quartz below 870 deg. C., but if a flux is present, will transform to tridymite. The inversions relating cristobalite and tridymite upon heating and cooling are as would be expected and take place slowly either in the dry state or in the presence of a solvent. The rate at which they occur is increased markedly by the presence of the flux."

All this obviously is of direct interest to the portland cement and concrete industries. Actually, at this time, apparently we are not at all certain that the silica in hydrated cement exists as a tridymite or cristobalite lattice with $Ca(OH)_2$ particles "salted" in the gaps of the silica lattice, or whether it is actually a hydrated "calcium silicate" of a more definite or peculiar lattice of its own. The fact that the combination readily loses its $Ca(OH)_2$ to solution leaving the silica intact would seem to substantiate the theory that no definite compounds of CaO, SiO_2, H_2O really exist. Also, we do not actually know why a little alkali should be detrimental to concrete, since obviously it should help promote the very reactions in concrete that are most to be desired. Probably more depends on the state of the silica involved in these reactions than we now know, for the alkali-quartz reaction is very slow at room temperatures, if appreciable at all, while the "detrimental" reactions apparently occur only when the silica in the aggregate is in the form of cristobalite or tridymite, and then only when such reactions are concentrated in a small area.

Lime-Burning and Beneficiating Patents

ACCORDING TO A RECENT REPORT in *Limeographs*, a U.S. patent (No. 2,491,302) was issued on July 24, 1945, to Harold J. Dunton, San Jose, Calif., on a "process of beneficiating cherty minerals." The process was said to be based on the premise that it has been impossible to derive commercial value from cherty limestone because the rock is too hard to grind. By calcining the rock so that the limestone is converted to quicklime, and then hydrating the resulting quicklime, it is possible to separate the hydrate from the remaining chert (silica). Due to the calcination, the chert can then be ground easily to almost any size. In this manner, the patent claims it is possible to obtain *two* marketable products.

Also reported in *Limeographs* was the issuance of patent No. 2,498,710, to Bruno E. Roetheli, Cranford, N. J., an engineer for Standard Oil Development Co., on a new process for burning lime in a vertical kiln.



Select the best for each particular purpose from among the many Harbison-Walker types and classes especially adapted for all the various factors and conditions involved in the operation of rotary cement kilns.

Brands with long life records
Basic Refractories for High Temperature Zones

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Leading High-Alumina Brands

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Various high duty and super-duty fireclay brick brands of superior quality are available from plants which afford lowest transportation costs—Pennsylvania—Missouri—Ohio—Alabama—Texas—Kentucky.

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WORLD'S LARGEST PRODUCER OF REFRACTORIES
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Cemstone Products Co. reports "new Deister UHS cushions vibrations . . . completely solved our maintenance problems."

Solves Maintenance Problems

Before installing a new Deister Heavy-Duty UHS Vibrating Screen, Cemstone Products Co. of St. Paul, Minn. had excess maintenance costs from transmitted vibration . . . and bearing troubles.

Installed in July, 1952, the new Deister UHS — a double-deck 4' x 12' model — has *solved* maintenance problems. Its floating action and over-size springs *cushion* vibrations to supporting structure . . . the hopper no longer shakes, bearing troubles are absent, and production is *up*.

Here's why users like it!

1. Life-time unitized vibrating mechanism . . . a precision-built, jig-assembled unit. Two bearing construction. Runs in bath of oil. Renewable sleeves.

2. Opposed elliptical throw . . . Deister's exclusive powerful throw action controls the movement of material on the screen for greatest speed and efficiency in sizing.

3. Divided screening sections . . . identical in size, may be readily interchanged or shifted to distribute normal wear and prolong life of screening medium. Different size openings may be used with each section, allowing up to 3 sizes on each deck.

4. Sizes . . . 3', 4' and 5' widths; 10', 12' and 14' long and in single, double and triple deck models.

DEISTER SCREENS

DEISTER MACHINE COMPANY
FORT WAYNE 4, INDIANA

Hard Hats for Safety

(Continued from page 114)

down." Then there is always the insidious hazard of air slacking slowly but inexorably, infiltrating the hair-fine fissures in the seemingly solid rock to produce ever widening cracks that suddenly release their grip to drop a boulder from any height. The hard hat cannot protect the wearer against all of the falls, but the odds are highly in favor of the man wearing one for while the blow may fell him like a pole-axed ox he may readily live to see many another day of productive mining.

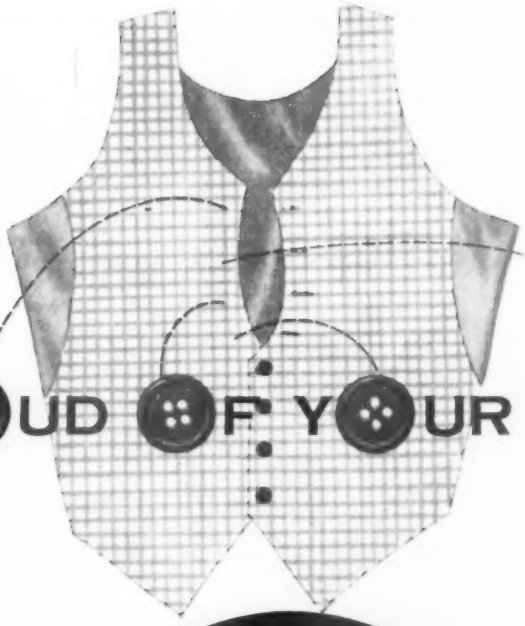
Shaft work is a "natural" for the best in head protection since there has been no repeal of Newton's law of gravity and "all that goes up must still come down," and usually with a vengeance in shaft work. Not only is there the danger of scaling walls before timber or gunite, but also the risk of falling spills from muck buckets, wrenches, bolts and miscellaneous shaft equipment.

While new developments begin on the right foot forward by keeping the all pervading trolley wire the conventional 7 ft. above rail level, keeping it at that elevation is quite something else again as time finds timber rot and increasing loading slowly but steadily bowing down the caps, while the posts squeeze muck up under the track. Repairs are not economically feasible because of the impending exhaustion of the ore body, hence everyone "ducks" the hazard of the low trolley wire. Time was when the man who failed to "duck" was knocked off of his pins by the jolting direct current which, fortunately for miners, kicks like the proverbial mule, and usually does not "freeze" the victim to the wire as does alternating current. The fine insulating feature of the hard hat with non-conducting dome and internal hammock, even though soaking wet, protects these workers in their steadily shrinking scene of activity.

Increasing emphasis of safety in employe relations will lead to more wide-spread use of safety hats and other accident-preventive clothing and equipment by workers in the industrial minerals industries.

Safety Awards

VALLEY DOLOMITE CORP., St. Louis, Mo., promotes safety consciousness among its employes by sponsoring safety contests between the various plant departments. The department or departments completing six months of operation without a lost-time accident are eligible for a safety award. Safety awards were recently presented to 72 employes of the transportation, quarry and mill and burning plant departments. The award consisted of a gold tie clip with the employe's name engraved on it. Presentation of the awards was made at a special ceremony by Ben P. Donnell.



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2. Clean, colorful brand printing.
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SINCE 1847

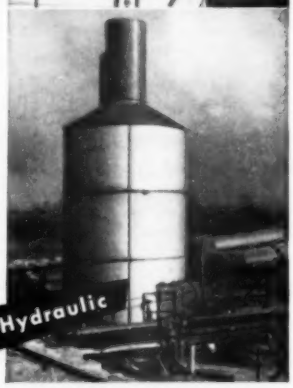
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Guaranteed efficiency of fume and dust collection systems engineered and built by Norblo is obtainable because Norblo Equipment includes automatic bag type, improved centrifugal, and hydraulic types. Your operations may require one of these types — or all three! Norblo can tell you — will engineer the necessary combination to handle your dust and fume collection at most economical cost. More than 40 years experience serving many industries. State your problem so we can send literature on equipment applicable to your needs.









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Ask for Bulletin 163-5

The Northern Blower Company

Engineered Dust Collection Systems for All Industries

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Rod Mill Grinding

(Continued from page 104)

Sieve tests of the finished product are run from representative samples taken of the sand in cars.

Percentage of water introduced into the mill controls the period of retention. A reduction in water results in a finer product and, conversely, an increase in the water and feed will yield a coarser product. Adjustments to the product ordinarily are made through varying the water content through the mill. The second preferred adjustment is to rate of feed of gravel. A third adjustment, usually made each month, is changing the rod charge. Speed of rotation of the mill could be another adjustment but, in this installation, mill speed is held constant at 38 r.p.m. which is 75 percent of critical speed.

Under average conditions of best performance, the water content is from 42 to 43.5 percent in producing a mill product, F.M. from 3.0-3.25, at the rate of 24 t.p.h.

Log Sheet Record

Close control of rod mill operation is kept through daily checking of rate of output and analyses of the product, and through maintenance of a daily log sheet. An accurate record of hours of operation is kept. Rate of feed of material into both ends of the mill is checked frequently throughout the day. This is done by diverting the stream of gravel from the feed spouts into a bag, at each end of the mill, for a period of 15 seconds and weighing the contents. By striking an average,



Conveyor bringing pea gravel into feed bin

the production of the mill is calculated for that day and computed in t.p.h. A 15-second sample for each end of the mill would weigh 103 lb. for a mill output of 24 t.p.h. This is the test which indicates the rate of rod wear and is used as a guide for the addition of more rods.

All the readings and the conversion into t.p.h. are recorded on the log sheet together with the time. Similarly, the water meter readings are recorded and calculated to give the cu. ft. and lb. per hr., with a total figure for the day in pounds and a calculation of water content in terms of percentage

(Continued on page 140)

No Blinding!

...SCREENING MOIST PULVERIZED LIMESTONE

ALLIS-CHALMERS

THERMO-DECK Heating Unit



No blinding on this *Ripl-Flo* screen handling moist limestone.



This is what happened on the same screen when we turned the *Thermo-Deck* heating unit off for half an hour.

Thermo-Deck heating units can be applied to your Allis-Chalmers screens in the field. For more facts, call the A-C representative in your area or write for Bulletin 07B7812. Allis-Chalmers, Milwaukee 1, Wisconsin.

SCREENS MOIST, FINE MATERIALS . . . with no "time out" to clear the screen cloth. Low voltage resistance heating keeps screen mesh free of blinding.

HEATED CLOTH LASTS 3 TIMES AS LONG! Clear screen cloth carries less weight than blinded cloth; has less tendency to whip. Damage resulting from pounding or brushing is greatly reduced.

SCREENING CAPACITY INCREASED 2 WAYS! More tonnage goes through the screen when cloth *remains* open. And, with no downtime to clear the screen, more tonnage goes through per day. A-3935

Thermo-Deck and *Ripl-Flo* are Allis-Chalmers trademarks.

ALLIS-CHALMERS

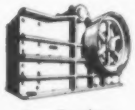
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DUMP a heavy shovelful of rock into a Heil body! It takes the punishing shock in stride . . . comes back for more, shift after shift, year after year. The 2" hardwood cushion sandwiched between the body bottom and wearing plate absorbs load shock. Rigid reinforcing by box-member ribs, no-sag body construction and the many other Heil extra-strength features assure profitable operation on the toughest jobs. For cold weather work or sticky gumbo, Heil Bodies can be supplied with heated floor construction.

Heil fast-acting, simple, trouble-free hoists are designed for heavy-duty service.

See your Heil distributor for detailed information . . . and be sure to specify a Heil Body and Hoist for every truck.

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BH-10



HEILINER 13 AND 18-CU. YD. SCRAPERS



HEILINER 20-CU. YD. BOTTOM DUMP WAGON



CONTRACTOR'S BODY

Rod Mill Grinding

(Continued from page 138)

of the total feed. A compensation for 3 percent moisture in the gravel feed is made in determining the rate of water feed. The log sheet also has the average sieve analysis and F.M. of the rod mill product for the day.

If the F. M. of the rod mill product is too high when holding the water rate and feed constant, for any desired rate of production, the need for increasing the rod change is usually indicated. Rods are added according to schedule, based on rate of use, which has been calculated in lb. per ton of production over many months of operation. Additions are made once a month, when the rate of rod wear is calculated. A running inventory is kept, corrected to conform with production. Principal wear is on the ends of the rods where they take impact.

Experience has been that the mill will perform satisfactorily and close to top capacity in meeting requirements at this plant even though the rod loading is not held at or near peak load. Peak rod load is 9 tons but 7½ tons is the maximum carried in order not to over-grind. In one check on rod wear, when the mill was dumped and the rod charge weighed, the rod load was down to 5 tons. Mill performance had not indicated that there was a serious shortage of rod load, indicating that the mill would give good results even though only 35 percent of its volume be filled with rods.

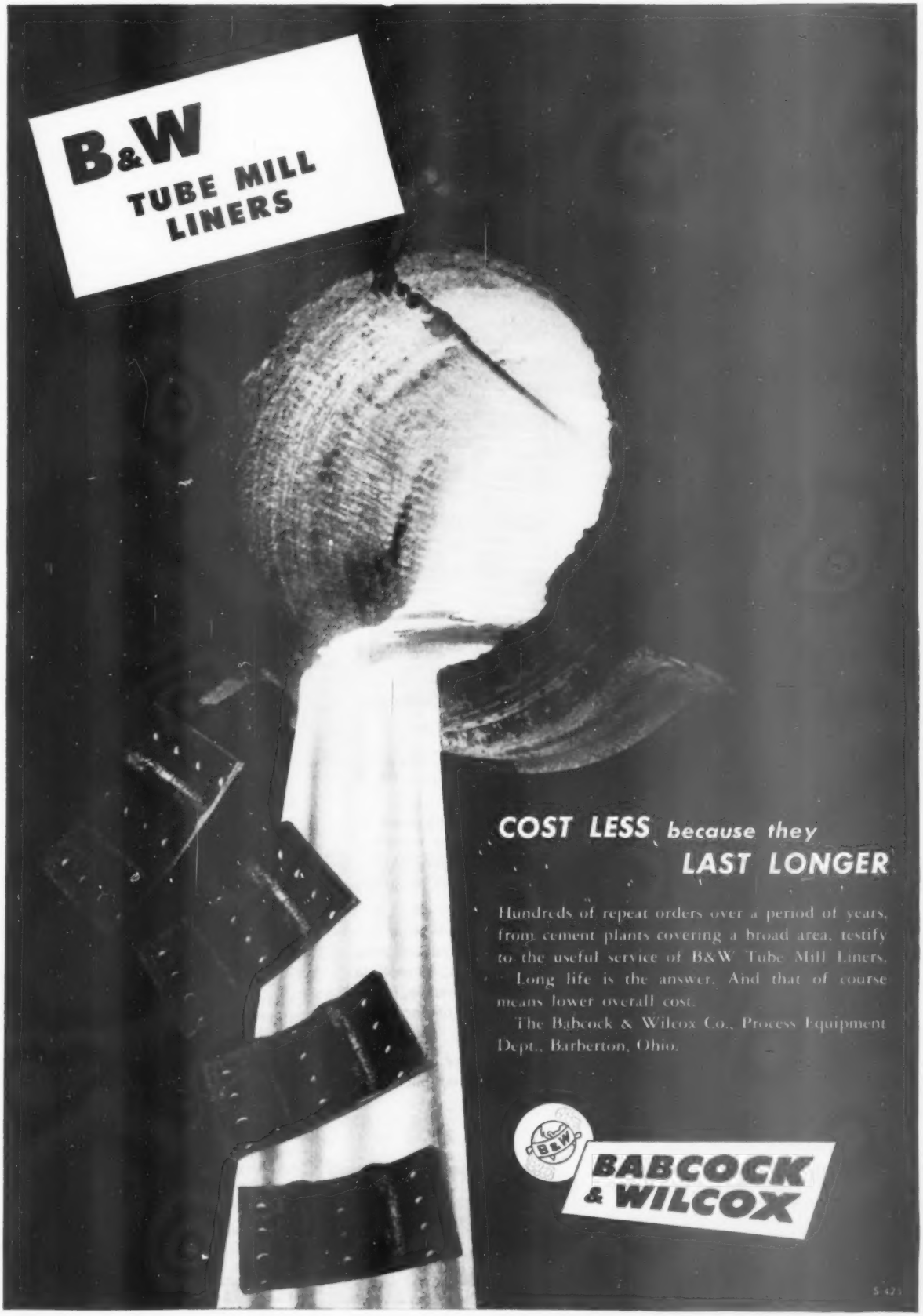
Regardless of the F.M. of the rod mill product, the percentage retained on a 4-mesh screen is seldom as high as one percent, whether the feed be pea gravel or of larger gravel up to 1 or 1½-in. size. The rods function as a screen to prevent discharge until the product is smaller than 4 mesh.

When originally started, a mixed charge of 2-2½ and 3-in. rods was used but only the 3-in. size is used for make-up. Worn rods are removed when they wear to a sharp point at the ends. A mixed feed, of pea gravel and cone crusher product, yields a product of better gradation and F.M. than does a feed of straight pea gravel. At times as much as 50 percent cone crusher product is fed the mill, and the entire feed has been of the coarser material on occasion with little change in mill capacity.

Proportions of coarse gravel and pea gravel are regulated by adjusting the feeders. The feeders have rectifiers for conversion from a-c to d-c current for variable speed. A typical mixed feed material has 100 percent passing the 1½-in. screen, and has the following gradations:

Screen	Accumulative (Retained)
1 in.	8 percent
¾ in.	20 percent
½ in.	28.1 percent
No. 4	70.7 percent
28 M	98.5 percent

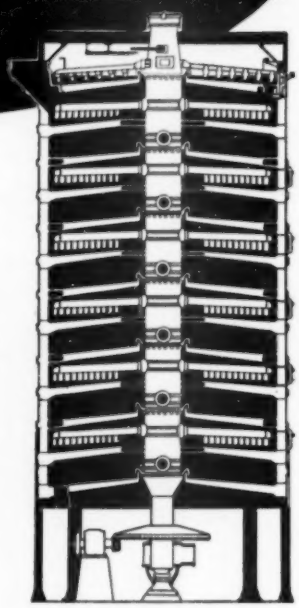
(Continued on page 142)


B&W
TUBE MILL
LINERS
COST LESS because they
LAST LONGER
Hundreds of repeat orders over a period of years, from cement plants covering a broad area, testify to the useful service of B&W Tube Mill Liners.
Long life is the answer. And that of course means lower overall cost.
The Babcock & Wilcox Co., Process Equipment Dept., Barberton, Ohio.
BABCOCK & WILCOX

Nichols Herreshoff* • Bethlehem Wedge*

Roasting Furnaces

For the Mining Industry



Nichols and Bethlehem Wedge Multiple Hearth Furnaces are widely employed by the world's mining industries in many diverse applications involving both metallic and non-metallic minerals. Exclusive design features providing furnace adaptability to different processing requirements make these furnaces efficient and economical.

In addition to equipment, Nichols offers complete engineering services, from research to plant operation.

* Reg. U. S. Pat. Off.

Roasting..

Nichols-Wedge furnaces are being used to roast ores and concentrates for the manufacture of acids and/or the production of zinc, copper, molybdenum, nickel, cobalt, tungsten, mercury, etc.

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In the non-metallic field, Nichols-Wedge furnaces are successfully drying and calcining limestone fines, gypsum, kaolin, phosphate rock, soda products, vermiculite, bauxite, fullers earth and diatomaceous earth, among other materials.

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We maintain completely equipped and staffed facilities for custom roasting and pilot-plant testing operations.

Write for Bulletin No. 224

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Rod Mill Grinding

(Continued from page 140)

Cost of operation of the rod mill, including liners, rod wear, wear on the mill heads, labor and power averages 15 cents per ton of sand ground. Rod wear has averaged 0.6 lb. per ton and the original lining was replaced after two years of service. This lining was of 1½-in. cold-rolled steel and has been replaced by a 2-in. Ni-Hard cast iron lining. The cost is 2 cents per ton of sand based on the replacement price of the new lining.

Rod consumption costs 5 cents per ton representing 0.6 lb. of rod for each ton of sand produced. The total cost figure for rod and liner consumption plus the mill heads is 7½ cents per ton. An operator is required and this represents a cost of 6 cents per ton of sand. Power is also included in the 15 cents per ton total. The mill draws 140 amperes (180 is peak) or about 60 hp. The belt conveyors have 5-hp. drives but pull less than one-half that amount and the bucket elevator has a 5-hp. drive which is also over-capacity.

Sand is selling for about 15 cents per ton more than pea gravel in this market, which takes care of the cost of producing sand from pea gravel. Thus, without added operating cost, the rod mill installation has made it possible for the company to increase its business and also have close control over the uniformity of its concrete sand.

Dixie Sand and Gravel Corp. is a subsidiary of Penn-Dixie Cement Corp., which has its headquarters in New York, N. Y. The original sand and gravel plant was taken over in 1918 by the old Dixie Portland cement Co. and the existing plant was built in 1921. C. Edson Hardy, Jr., vice-president in charge of operations, designed the concrete back in 1921 and he also was engineer for the rod mill installation 29 years later. A. T. Garner is superintendent of the plant.

In December of last year, the Dixie Sand & Gravel Corp. acquired a ladder dredge and diesel towboat from the liquidators of the McCardy-Rodgers Co., at Pittsburgh, Penn. The dredge is the old Dravo No. 10 and is a sister dredge to Dravo No. 9, currently in operation by the Keystone division of the Dravo Corp. on the Ohio River below Pittsburgh. The dredge is steam driven, equipped with 4-cu. ft. buckets, and will dredge approximately 350 t.p.h. The dredge can reach to a depth of 55 ft. below the water line. The towboat is equipped with two 270 hp. Superior diesel engines, and was built by St. Louis Shipbuilding Corp. in 1947. Formerly known as the W. F. McCardy, the towboat has been renamed the T. R. Preston.

•

Charles W. Barger and Son Ready Mixed Concrete Co., Inc., Lexington, Va., has been incorporated with $25,000 capitalization, with Charles W. Barger, Jr., as president.

GM DIESEL
CASE HISTORY NO. IA5-40

OWNER: Flomaton Gravel Company, Flomaton, Alabama

INSTALLATION: GM 4-71 Diesel powers a Pekor 6" centrifugal pump on sand dredge. Pumps 400 to 450 feet to discharge table with 40-foot head. Engine replaced another make Diesel in 1947.

PERFORMANCE: Owner reports repowering boosted production 50% with no increase in fuel costs. He now pumps 35 to 40 cu. yds. per hour, operating 8 hours a day, year around. GM Diesel has required no repairs in six years.



It pays to STANDARDIZE on

GM
GENERAL MOTORS
DIESEL POWER

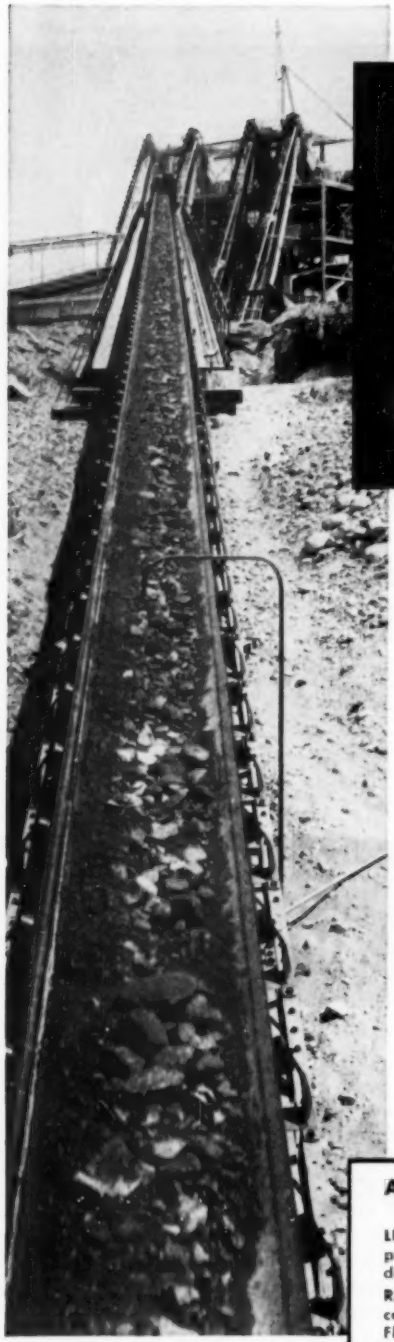
PUMPS 50% MORE SAND USES NO MORE FUEL

After seeing what this engine did, Owner A. R. Bethea powered two other dredges with General Motors Diesels. Besides being steady, dependable producers, GM Diesels' compactness and lighter weight permitted him to build lighter and less expensive dredges.

A GM Diesel engine boosts production on all kinds of heavy-duty jobs because, with power on *every* piston downstroke, it delivers smoother, steadier power. Its simple, rugged design keeps your equipment on the job and working at top speed. It has no troublesome high pressure fuel lines to cause costly delays.

And when service is needed, you'll find the cost surprisingly low. GM Diesel parts cost less. They're readily available everywhere. They're quick and easy to replace. If you want to boost production and reduce operating expense, find out about GM Diesel power. Contact your distributor or write us for complete information.

DETROIT DIESEL ENGINE DIVISION
GENERAL MOTORS • DETROIT 28, MICHIGAN
Single Engines . . . 16 to 275 H.P. Multiple Units . . . Up to 840 H.P.



1,056-ft. AMERICAN 6-ply, 36 oz. belt, 36" wide, at Southern California aggregate plant.

GOT CONVEYOR OR ELEVATOR BELT PROBLEMS?

Call American

We're specifically set up to handle each belt application on an individual basis. Your AMERICAN belt is "tailored" to your conveyor set-up, the materials you handle, and to your operating conditions . . . *at no extra cost.*

The result is a belt perfectly matched to your needs, assuring *extra performance and added service life.* You'll be dollars and tons ahead to call AMERICAN *now.*

CONVEYOR ENGINEERING DATA . . .

AMERICAN's complete catalog includes five pages of helpful, factual data on belt capacities, materials characteristics, h.p. requirements, tension ratios, belt weights, etc. Write for *your* copy TODAY.

AMERICAN "SPECIALS"
Lick Special Jobs . . .

LIGHTNING RIBBED CENTER BELT grips slippery, loose material; increases tonnage, reduces abrasion.

RAISED CENTER BELT puts extra rubber in center to take wear, cushion loading shock. Flexible sides trough easier.

PULLEY LAGGING (block, friction, or crowned) eliminates excessive take-up tension, usually permits use of fewer plies.

AR-17

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N.S.G.A. Safety Competition

THE ELIOT NO. 104 PLANT of Pacific Coast Aggregates Inc., Pleasanton, Calif., the West Des Moines plant of Concrete Materials Co., West Des Moines, Iowa, and the Bennett plant of Thomas Gravel Co., Birdville, Texas, were winners in their respective groups of the 1952 National Sand and Gravel Association Safety Competition, conducted by the Bureau of Mines. In recognition of their outstanding safety records, these winning plants will be awarded the ROCK PRODUCTS safety trophies at the annual N.S.G.A. convention next February. In addition to the trophy awards, Certificates of Achievement in Safety were awarded by N.S.G.A. to the winning plants, plus a Certificate of Accomplishment in Safety to each production employe at these plants. The association also awarded Certificates of Achievement to all plants which operated 20,000 or more man-hours during 1952 without a lost-time injury.

The Eliot No. 104 plant, a wet-pit operation and winner of the group working more than 100,000 man-hours, operated 161,664 man-hours without a disabling injury. This is the first such award to this plant which has been enrolled in the competition since 1947. During the six years it has been a participant, the plant has operated a total of 865,185 man-hours without a fatality, a permanent total injury, or a partial permanent injury; all 28 lost-time injuries recorded during this period were of a temporary nature.

The West Des Moines dredge operation, with a record of 98,340 man-hours of operation without a lost-time injury, was the winner of the group working 50,001-100,000 man-hours.

The Bennett plant, a wet-pit operation, worked a total of 48,042 man-hours without a disabling injury, winning the award for the group working 50,000 or less man-hours. This is the second time this plant has won a trophy since its enrollment in the competition in 1947.

A record number of 125 sand and gravel plants was enrolled in the 1952 competition. During a total worktime of 9,103,573 man-hours, the largest volume in the 24-year history of the competition, there were 243 lost-time injuries, or 14 more than in 1951, when competing plants were operated 8,845,779 man-hours. One of the injuries in 1952 resulted in death, ten were permanent partial disabilities, and 232 were temporary total injuries. The injury severity rate was 2.110 days lost per thousand man-hours of operation, and the injury frequency rate was 26.693 per million man-hours.

Of the 125 plants participating (89 bank or pit and 36 dredge operations), 51 had perfect safety records for 1952. Men at these operations worked an aggregate of 2,221,860 man-hours, or

They're licked before they start

Super-Tempered Precision Space Screens defy Abrasion, Vibration and Fatigue to do their worst. These durable screens stay tight and give extra long wear on the most punishing jobs because they're made of hard and tough super-tempered steel wire that's precision crimped and woven on powerful hydraulic machines.

Specify Super-Tempered Precision Space Screens and find out how they save you money in less downtime and longer life; greater tonnage output at lower cost. To order, write or phone our nearest sales office.

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THE COLORADO FUEL AND IRON CORPORATION, Denver, Colorado
PACIFIC COAST DIVISION, Oakland, California

SUPER-TEMPERED
PRECISION SPACE SCREENS CF&I
PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION



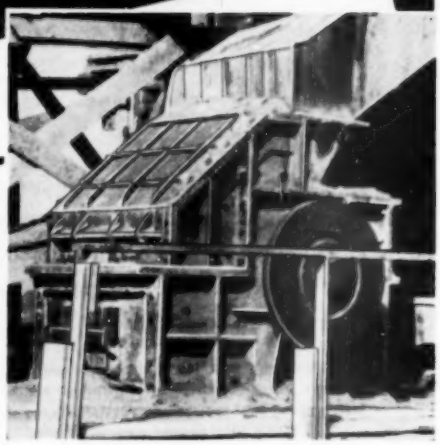
1941

ANOTHER
AMERICAN HAMMERMILL
PERFORMANCE REPORT

50,000 TONS OF -5" ROCK TO AGLIME

... WITHOUT A SINGLE REPAIR

FIELD REPORT
No. 21
Illinois Quarry



TYPE OF CRUSHER:
American ACS No. 4 Up Running Hammermill.

OPERATION:
Reducing minus 5" rock to agricultural limestone.

PRESENT CAPACITY: 60-120 tons per hour, depending on moisture content of stone.

PROBLEM: Very wet rock, showing 8% moisture—sticky at all times.

COMMENTS FROM USER: "Hammer wear is remarkable: 9400-9700 tons of lime ground to 100%, passing No. 8 mesh, per set of hammers . . . Remarkably efficient mill . . . meets our requirements in every way."

Write: for Bulletin No. 147 — "Better Stone Crushing"



American PULVERIZER COMPANY
Originators and Manufacturers of Ring Crushers and Pulverizers

1245 Macklind Ave. St. Louis 10, Mo.

24.4 percent of all hours worked at the competing plants. The following plants, excluding the trophy winners, were awarded Certificates of Achievement in Safety for their accident-free records. In addition, there were 11 injury-free plants which did not receive certificates because they did not fulfill the minimum requirement of 20,000 or more man-hours of operation through the year.

Dredge "Franklin" plant, Warner Co., Tullytown, Penn., 110,279 man-hours.
Quigley wet-pit plant, Gravel Mining Co., Hurst, Texas, 108,883 man-hours.
Crystal Lake dry-bank plant, Consumers Co., Crystal Lake, Ill., 88,347 man-hours.
Centerville No. 106 dry-pit plant, Pacific Coast Aggregates, Inc., Centerville, Calif., 87,223 man-hours.
Elgin dry-bank plant, The Chicago Gravel Co., Elgin, Ill., 83,109 man-hours.
Farr dry-wet pit plant, Gifford-Hill & Co., Inc., Texarkana, Texas, 81,239 man-hours.
Alleyton wet-pit plant, Texas Construction Material Co., Alleyton, Texas, 63,610 man-hours.
Snelling dry-pit plant, J. L. Shiely Co., St. Paul, Minn., 63,204 man-hours.
Hollimon wet-pit plant, Texas Construction Material Co., Alleyton, Texas, 62,167 man-hours.
Jere dry-wet pit plant, Southwest Construction Materials Co., Irving, Texas, 62,167 man-hours.
No. 7A dredge plant, Lyman-Richey Sand & Gravel Corp., La Platte, Neb., 55,367 man-hours.
Kingsbury wet-pit plant, Gravel Mining Co., Euless, Texas, 54,602 man-hours.
Fort Jefferson wet-pit plant, American Aggregates Corp., Fort Jefferson, Ohio, 53,768 man-hours.
No. 5 & 6 dredge plants, Lyman-Richey Sand & Gravel Corp., Plattsmouth, Neb., 53,502 man-hours.
Portland dry-bank plant, Portland Sand & Gravel Co., Portland, Penn., 47,201 man-hours.
Northport dry-bank plant, Metropolitan Sand & Gravel Corp., Northport, N.Y., 44,672 man-hours.
Hawarden wet-pit plant, L. G. Everist, Inc., Hawarden, Iowa, 43,999 man-hours.
Rockfield No. 124 wet-pit plant, Pacific Coast Aggregates, Inc., Friant, Calif., 41,799 man-hours.
Kalamazoo dry-bank plant, American Aggregates Corp., Kalamazoo, Mich., 41,232 man-hours.
Claremont No. 11 dry-pit plant, Consolidated Rock Products Co., Claremont, Calif., 40,499 man-hours.
Boonville No. 1 dry-bank plant, Eastern Rock Products, Inc., Boonville, N.Y., 36,453 man-hours.
No. 2A dredge plant, Lyman-Richey Sand & Gravel Corp., La Platte, Neb., 36,208 man-hours.
Yardley wet-pit plant, Union Sand & Gravel Co., Spokane, Wash., 36,143 man-hours.
West Wyoming dry-bank plant, Airport Sand & Gravel Co., West Wyoming, Penn., 32,000 man-hours.
Lindsay No. 123 wet-pit plant, Pacific Coast Aggregates, Inc., Lindsay, Calif., 31,939 man-hours.
Fort Wright dry-pit plant, Union Sand & Gravel Co., Spokane, Wash., 30,448 man-hours.
Holley dry-bank plant, Gifford-Hill & Co., Inc., Allamore, Texas, 29,879 man-hours.
Sierra No. 19 dry-pit plant, Consolidated Rock Products Co., Monrovia, Calif., 29,800 man-hours.
Fayetteville dry-pit plant, Cumberland Gravel & Sand Co., Fayetteville, N. C., 28,756 man-hours.
St. Louis dredge plant, Mississippi River Sand & Material Co., Independence City, Mo., 28,112 man-hours.
"F" dry-bank plant, The Buffalo Slag Co., Inc., Franklinville, N.Y., 25,914 man-hours.
Ricks wet-pit plant, Texas Construction Material Co., Alleyton, Texas, 24,470 man-hours.
No. 15 dredge plant, Lyman-Richey Sand & Gravel Corp., Columbus, Neb., 23,317 man-hours.
South Bend dry-pit plant, South Bend Sand & Gravel Corp., South Bend, Ind., 22,213 man-hours.
Olympia No. 125 dry-pit plant, Pacific Coast Aggregates, Inc., Felton, Calif., 20,536 man-hours.
Trenton No. 2 dry-pit plant, Eastern Rock Products, Inc., Barneveld, N. Y., 20,479 man-hours.
No. 23 dredge pant, Lyman-Richey Sand & Gravel Corp., Bridgeport, Neb., 20,322 man-hours.

ANNOUNCING
THE DU PONT VOLTOHMETER

. . . a triple-purpose precision instrument for testing electric blasting operations



The Du Pont Voltohmeter is an entirely new, all-purpose precision instrument designed for testing in connection with electric blasting. It combines the functions of Du Pont Blasting Galvanometers, and Detect-A-Meters, and offers many other advantages.

1. **As a blasting galvanometer,** the Voltohmeter may be used to measure resistance of electric blasting caps, blasting circuits and firing circuits accurately. One dial setting has a range of 0 to 100 ohms, and another, from 0 to 1000. The scale is graduated for easier, more accurate reading, and a convenient zero-mark adjustment is provided.

2. **As a stray-current detector,** the Voltohmeter offers greater flexibility in detecting, tracing and identifying both AC and DC voltages. Separate scales are provided reading from 0-1.5 volts DC, 0-1.5 volts AC, 0-30 volts DC and AC and 0-600 volts DC and AC.

3. **As a voltmeter,** the new Voltohmeter may be used for testing all power-line voltages commonly used in electric blasting operations, up to 600 volts . . . both AC and DC.

Each Voltohmeter is in a sturdy leather carrying case with shoulder strap and pocket containing two plastic insulated probe wires with insulated alligator clips shown below. An instruction plate and pamphlet are also included. Compact, it measures only $6\frac{5}{8}$ x $3\frac{7}{8}$ x $4\frac{1}{2}$ inches; weighs only $2\frac{1}{2}$ pounds.

Ask the Du Pont Explosives representative in your district for complete information about this new, highly efficient, triple-purpose instrument for promoting safer blasting. E. I. du Pont de Nemours & Co. (Inc.), Explosives Department, Wilmington 98, Delaware.

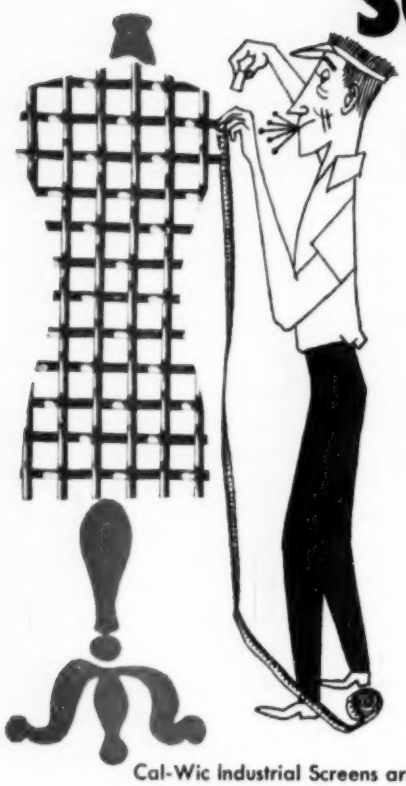
DU PONT EXPLOSIVES

Blasting Supplies and Accessories

DU PONT

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

CAL-WIC INDUSTRIAL SCREENS...



tailored to fit your specific needs

Cal-Wic Industrial Screens are manufactured in ferrous and non-ferrous metals to meet individual requirements and are woven to the most exacting tolerances to fit any specification.

We will be happy to help you pick the *right* CAL-WIC screen for your particular operation. For complete information on CAL-WIC Industrial Screens, write to the office nearest you.

Other CF&I Products for the Sand and Gravel Industry

Wickwire Rope Grinding Balls

Grinding Rods Light Rails and Accessories

THE COLORADO FUEL AND IRON CORPORATION—Denver and Oakland
WICKWIRE SPENCER STEEL DIVISION—New York

1936

CAL-WIC
INDUSTRIAL SCREENS CF&I
THE COLORADO FUEL AND IRON CORPORATION

NEW INCORPORATIONS

Redi-Mix Concrete Co., Inc., Lewiston, Maine, has been incorporated with 1000 shares of common stock, no par value. Shareholders and officers are M. D. Mills, president and director; V. E. Clark, treasurer and director; and Frank Coffin, director.

Mann Bros. Sand & Gravel, Inc., Elkhorn, Wis., was recently incorporated with 2000 shares of no-par-value common stock. The incorporators are Lawrence A., Robert D. and Donald Mann, with Lawrence A. Mann serving as registered agent.

Pizzino Concrete, Inc., Seven Hills, Ohio, has been incorporated with 250 shares of no-par common stock. The incorporator is James Pizzino.

Ideal Concrete, Inc., Buffalo, N.Y., has been incorporated by Philip J. Inzina, John J. Marino, Louis D. Mastrangelo and George A. Mastrangelo. Capitalization was listed at $100,000.

Empire Quarry Co., St. Joseph, Mo., has been incorporated with 500 shares of stock authorized at $100 par value each. The incorporators are T. M. Vaughn, F. E. Vaughn and R. A. Brown, Jr.

Olmos Rock Products Corp., San Antonio, Texas, has been incorporated with a capital stock of $5000. Charles M. Schoenfeld, Charles G. Schoenfeld and Wilbur B. Schoenfeld are the incorporators.

Waukesha Block Co., Inc., Waukesha, Wis., has been incorporated by A. L. Tilton of Wauwatosa, Wis. Capital stock consists of 500 shares of no-par-value stock and a minimum capital of $500.

The Sand & Gravel Products Co., Cleveland Heights, Ohio, was recently incorporated with 250 shares of no-par common stock. Philip Novitch, Maurice Wolko and Margaret Bellotti are the incorporators. Mr. Novitch is also listed as statutory agent.

Walters Sand Co., Manhattan, Kan., was recently incorporated with an authorized capital of $100,000. Joseph W. Menzie is resident agent.

Walter J. Heib Sand & Gravel, Inc., Buechel, Ky., has been incorporated with $100,000. Walter J. Hieb, Eva C. Hieb and Flora A. Hieb are the incorporators.

Concho Concrete Co., San Angelo, Texas, has been incorporated with $1000 in capital stock. The incorporators are Thomas L. Amis, Joseph S. Amis and Eugene M. Locke.

Channel Sand Co., Pasadena, Texas, has been granted a 10-year corporation charter. Capital stock was listed as $1000. L. L. Reber, Elvira Reber and Ray Tegler are the incorporators of the new concern.

Tarrant Gravel Co., a Delaware corporation, has been granted a 10-year

Before you buy:

COMPARE CLUTCHES!



Two Link-Belt Speeder 2½-yd. K-580's speed stripping at this Canadian mine.

Speed-o-Matic controls pay off in less operator fatigue, more output, lower maintenance



Speed-o-Matic Clutch — Power is transmitted directly into the 3-shoe clutch. Mechanical linkage is eliminated, over 150 fewer wearing parts in clutches alone. Piston actuated clutch automatically adjusts for heat and normal lining wear.

THOSE rig-beating rock jobs aren't so tough when you've got a shovel like the 2½-yd. Link-Belt Speeder K-580.

That's because this rugged rig's complete power hydraulic control system and Speed-o-Matic clutch provide precise control . . . eliminate mechanical linkage . . . result in fast, smooth, shock reducing operation. What's more, maintenance costs are greatly reduced.

Speed-o-Matic controls are easy on the operator, too. Short-throw levers are finger-tip-operated. Think what this reduction in "end-of-the-shift" letdown means in additional output.

To get details on the K-580, see your distributor or write for Catalog 2287. For the complete line, request Catalog 2373.

LINK-BELT SPEEDER CORPORATION 13.156
Cedar Rapids, Iowa

LINK-BELT SPEEDER
CORPORATION
BUILDERS OF A COMPLETE LINE OF CRAWLER, TRUCK AND WHEEL-MOUNTED SHOVEL-CRANES

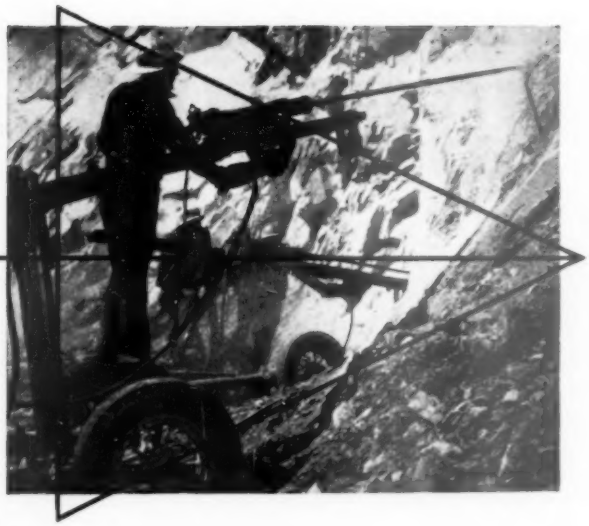
FACTORY-TRAINED DISTRIBUTOR SALES AND SERVICE SPECIALISTS ...*EVERYWHERE*

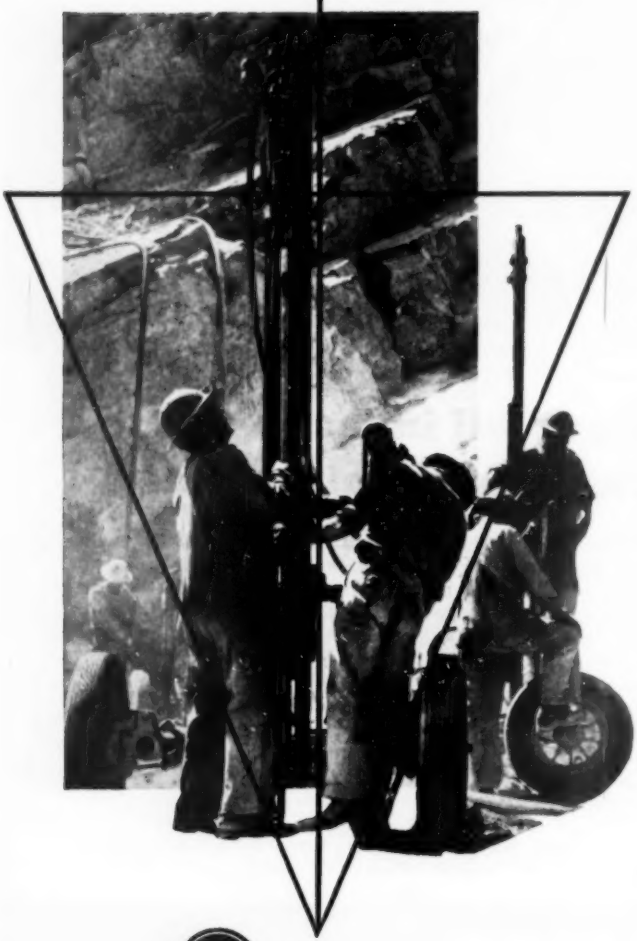
for faster drilling—

vertically

horizontally

at any angle





The G-300 WAGON DRILL drills rapidly, easily, efficiently on any location — being designed to utilize to full advantage the high drilling speed and strong rotation of the CP 4-inch 70-N Drifter.

Tubular chassis and drill carriage provide rigidity and strength without undue weight. Controls are conveniently centralized. Specially designed feed motor and cone-gear drive give great load-carrying capacity. Has heavy-duty centralizer. H-member drill support assures stability, minimizes vibration.

Wheels can be turned at right angles to facilitate line drilling or drilling close to a ledge or wall.

Write for complete information.

Chicago Pneumatic

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

permit for operation in the State of Texas. Capital stock was listed as $25,000. Texas headquarters have been established at Fort Worth, with Harold B. Pressley, Jr., as resident agent.

Acme Lannon Stone, Inc., Menomonee Falls, Wis., has been incorporated with 100 shares of stock, $50 par value. Minimum capital was listed at $500. Harvey J. Mann is the incorporator.

Spokane Concrete Pipe Co., Spokane, Wash., has been incorporated by Carl B. Warren, Charles E. Walters and R. E. Lowe, all of Spokane. The company, which was founded in 1919, is changing its capital structure from a proprietorship to a corporation.

Hutt Sand, Gravel and Cement, Inc., London, Ohio, has been incorporated with 250 shares of stock. Harry L. Lawner, Chester E. Finn and Joseph A. Williams are the incorporators, with Mr. Lawner as resident agent.

Flanders Concrete Coating Corp., Houston, Texas, has been incorporated with $1000 in capital stock. Fred D. Flanders, Leithe E. Flanders and Edwin H. Frank, Jr., are the incorporators.

White's Concrete Pipe Co. of Muleshoe, Inc., Muleshoe, Texas, has been incorporated with $10,000 in capital stock. The incorporators are G. A. White, Gilbert L. White and M. E. McClain.

Hy-Grade Concrete Co., Buffalo, N.Y., has been incorporated by Ernest Panebianco, Ralph Panebianco and Ralph Virginia.

Herald & Williamson, Inc., Lucasville, Ohio, has been incorporated to deal in sand and gravel. A. J. Herald, Conrad Herald and Wayne L. Williamson are the incorporators.

Hurst Gravel Co., a Delaware corporation, has been granted a 10-year corporation charter for operation in the State of Texas. Harold B. Pressley, Jr., has been named Texas agent, with headquarters in Fort Worth. Capital stock was listed as $25,000.

Charles W. Barger and Son Limestone Quarry, Inc., Lexington, Va., has been incorporated with $30,000 capitalization. Charles W. Barger, Jr., is president of the new corporation.

Virginia Aggregate Corp., Appalachia, Va., has been incorporated with 12,000 shares of capital stock. Samuel Caprari, West Pittston, Penn., has been named president.

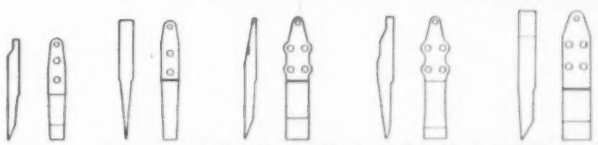
Milwaukee Lannon Stone Co., Inc., Milwaukee, Wis., has been incorporated by John Cappelletti, Jr. Authorized stock consists of 100 shares at $50 par value, with a minimum capital of $500.

Easy Lay Mortar Mix Co., Houston, Texas, has been incorporated by Marvin Joseph, N. A. Johnson and H. W. Kirkpatrick. Capital stock was listed as $10,030.

Flanagain Sand Co., Inc., Houston,



for Added Efficiency!



Types of Standard Teeth for Various Conventional Operations



Corner teeth

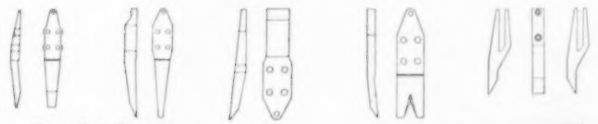


Side cutting teeth

A bucket of recognized ability becomes a greatly improved "digger" when equipped with teeth of proper type and design.

Owen Buckets are designed to utilize the weight of the bucket to force the teeth into the material when dropped contributing to their reputation as exceptionally efficient digging buckets.

Owen teeth are designed especially for "deep penetration"—teeth that "grasp and hold"—teeth for "breaking down resistance at corners" to aid shell penetration—side teeth "to cut wall clearance" in trench excavation, etc.



Special Teeth



"A mouthful for every job"

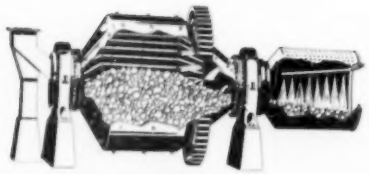
BUCKETS AND GRAPPLES

Write for Catalog

THE OWEN BUCKET CO.

6040 Breakwater Avenue • Cleveland, Ohio

Branches: New York, Philadelphia, Chicago, Berkeley, Calif., Fort Lauderdale Fla.

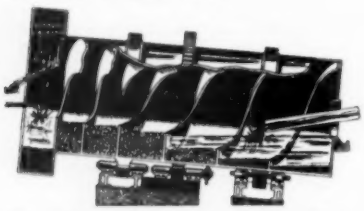


Conical Scrubber
For speedy removal of clay and dirt from quarry or mine product after preliminary crushing. Bulletin 37-A-7.



HARDINGE SCRUBBERS AND CLASSIFIERS

Hardinge Air Classifier
Product fineness closely controlled down to 99½ passing 325 mesh. Bulletin 17-B-7.



Counter-Current Classifier
A simple and trouble free device for wet separations between 20 and 200 mesh. Bulletin 39-B-7.



Hardinge Hydro-Classifier
Combined with counter-current unit, positive control of sizing and moisture of both oversize and fines is possible. Separations from 48 mesh to finer than 400 mesh can be made. Bulletin 39-B-7.

HARDINGE
COMPANY, INCORPORATED

YORK, PENNSYLVANIA • 240 Arch St. • Main Office and Works

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Texas, has been incorporated with a capital stock of $1750. The incorporators are O. R. Flanagain, Floy L. Flanagain and G. M. Myer.

Vermiculite Plants

ZONOLITE Co., Chicago, Ill., has announced the acquisition of vermiculite processing plants in New Orleans, La., and Dallas, Texas. In New Orleans, the company has taken over the plant of the former Southern Mineralite Co., Inc. The plant will process vermiculite ore for use in Louisiana and southeastern Texas. John A. McEachern is sales representative for the new area and C. G. Moody is plant manager.

Texas Vermiculite Co., a Zonolite subsidiary, will move its main office from Burnet, Texas, to its newly acquired Dallas plant, formerly operated by another building materials firm. Vermiculite processing equipment has been installed in the new plant, which will supplement operations at Burnet. R. B. Moran is general manager of the Texas division.

Slag-Gypsum Cement

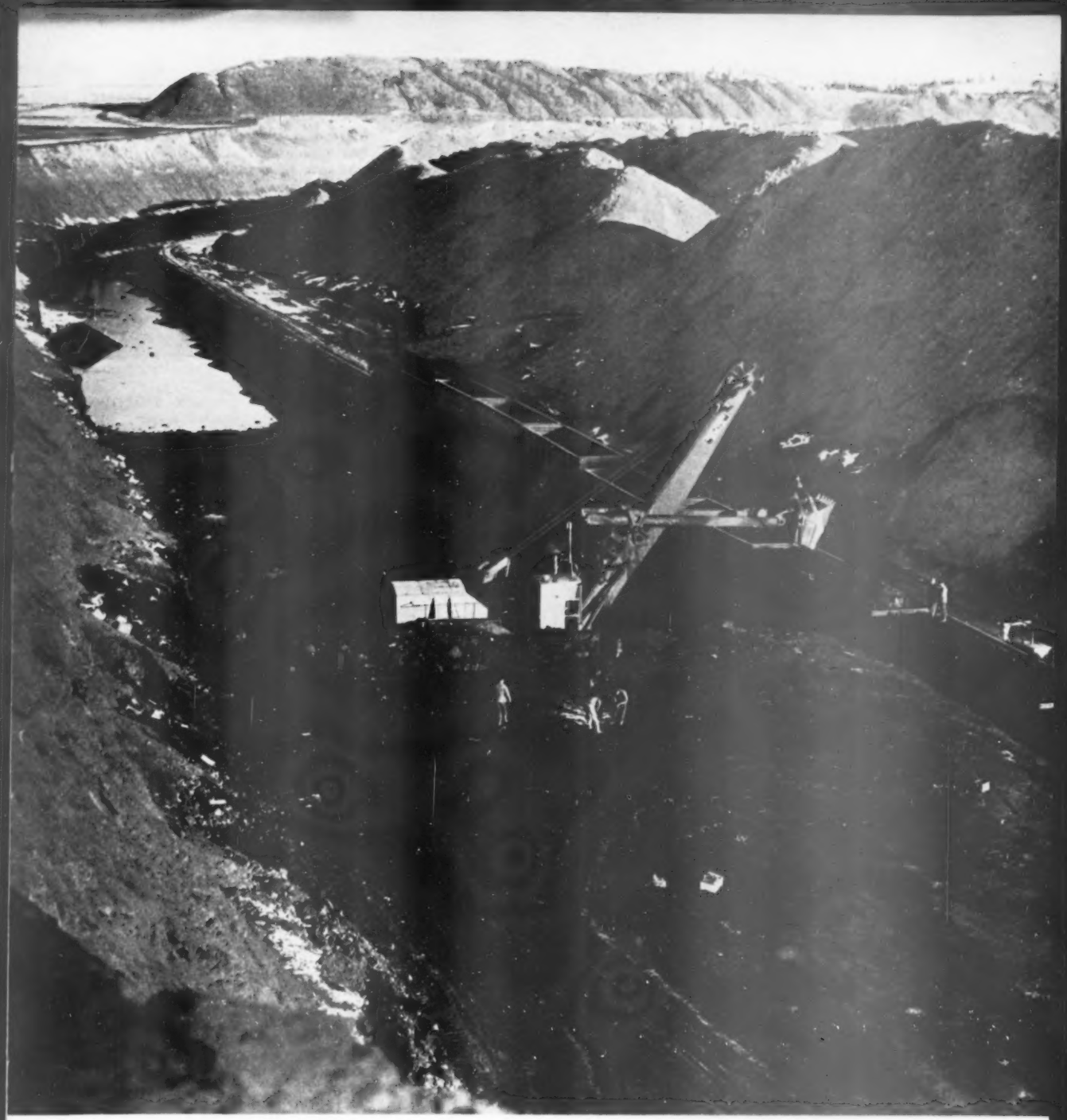
BY GRINDING A SLAG of proper chemical composition very fine with gypsum and a little portland cement clinker, a cement is obtained which compares favorably with portland in strength, in the effect of water-cement ratios on the strength in aging and in workability. It has the advantage of evolving rather low heat on hardening, and is very resistant to many corrosive solutions, such as sulfates and alkalies. Its cost of production is less than for portland cement. These properties should result in considerable use as it becomes better known. It is described by W. Kramer in Betonstein-Zeitung, Vol. 18, No. 11, p. 405 (1952).

Bulk Transport of Cement

THE GERMANS, when they want to transport cement in bulk by either trucks or railroad cars customarily use relatively small containers, and so when they decided to build a ship for bulk transport, they built many compartments, each holding three to five tons. A compressor and other equipment for emptying these containers are provided on the ship. Considerable savings reportedly were effected. (A. Roehnisch and W. Muegge, *Zement-Kalk-Gips*, Vol. 5, No. 12, p. 394, Dec., 1952.)

Aggregate Plant

MOSS LIGHTWEIGHT AGGREGATE Co., subsidiary of John A. Denie's Sons Co., has started operation of its new lightweight aggregate plant at Memphis, Tenn. The product of the new plant is an expanded clay aggregate known as Denilite aggregate. Plant capacity is approximately 750 cu. yd. of finished aggregate per 24-hr. day. N. A. Moss is president and Forrest Ladd is vice-president.



IMPOSSIBLE WITHOUT EXPLOSIVES

During 1953, stripping operations will account for some 120 million tons of coal, or close to one-quarter of the total annual production. In extreme cases, deposits 150 feet or more below the earth's surface have been mined. For every five feet of coal thickness, an average of 39 feet of overburden first has to be removed. It's a job that never could be handled economically without explosives. Hercules has pioneered in developing the right types of explosives and has the service facilities to help solve any blasting problem concerning coal mining, metal mining, quarrying, construction, petroleum.

HERCULES POWDER COMPANY

Explosives Department, 946 King St., Wilmington 99, Del.

Birmingham, Ala.; Chicago, Ill.; Duluth, Minn.; Hazleton, Pa.; Joplin, Mo.; Los Angeles, Cal.; New York, N. Y.; Pittsburgh, Pa.; Salt Lake City, Utah; San Francisco, Cal.

SUPER-HIGHWAYS FOR WATER



When it comes to traffic in water, you can depend on Naylor lightweight pipe for uninterrupted service. This distinctive lockseamed, spiralwelded pipe gives you lines that are extra strong, safe, leaktight. Naylor pipe is easy to handle and install—especially with Naylor Wedge-Lock couplings to speed connections. Sizes from 4 to 30 inches in diameter. Write for Bulletins No. 507 and No. 513.



NAYLOR PIPE COMPANY
1237 East 92nd Street, Chicago 19, Illinois
New York Office: 350 Madison Avenue, New York 17, New York

MANUFACTURERS NEWS

Gardner-Denver Co., Quincy, Ill., has appointed C. H. Rieman as sales manager of the mining and construction divisions. A graduate of the University of Minnesota School of Mines, Mr. Rieman joined the Quincy, Ill., branch office in 1937. Three years later he was transferred to the San Francisco branch office, serving there until 1948, when he was appointed district manager of the Duluth office. In 1951 Mr. Rieman was named sales manager of the mining division in Quincy. He was appointed to his present position upon the retirement of R. H. Pearson, who was vice-president and sales manager of the construction and oil field divisions.



C. H. Rieman

Hewitt-Robins, Inc., Stamford, Conn., announces that Austin Goodyear, general manager of the rubber and conveyor divisions, has been elected a vice-president. He was elected a director in 1952. Arthur W. Fasold, formerly a field engineer in Charleston, W. Va., has been appointed assistant manager of the commercial research department.

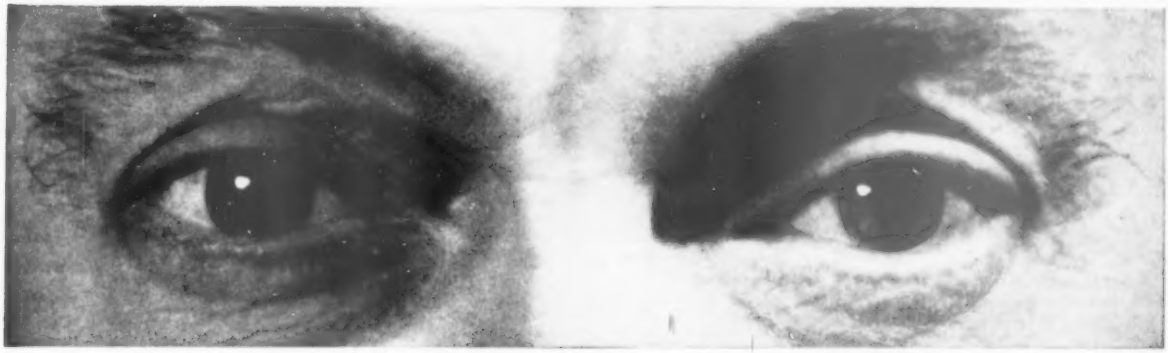
Waukesha Motor Co., Waukesha, Wis., has announced the election of Morgan R. Butler, Sr., as a director of the company. Mr. Butler is president and treasurer of the Butler Bin Co. and a former mayor of the City of Waukesha. Born in Hollis, N. Y., Mr. Butler was graduated from New York University as a civil engineer. He went to Waukesha and served as a construction engineer for the Milwaukee Electric Railway & Light Co. for several years. He was city engineer from 1910 to 1914, when he organized the Butler Construction Co., which built concrete roads, sewage disposal installations and other public construction projects. In 1922 the name was changed to Butler Bin Co., with concentration on manufacturing steel storage bins, weighing batchers, screw conveyors and bucket elevators for storing, handling and proportioning sand, gravel and cement.



Morgan R. Butler, Sr.

Barber-Greene Co., Aurora, Ill., announces that Kentner W. Shell, formerly a member of the field engineer section, has been named manager of the No. 2 area, which comprises New Jersey, Maryland, Delaware, Pennsylvania, Virginia, West Virginia, Dis-

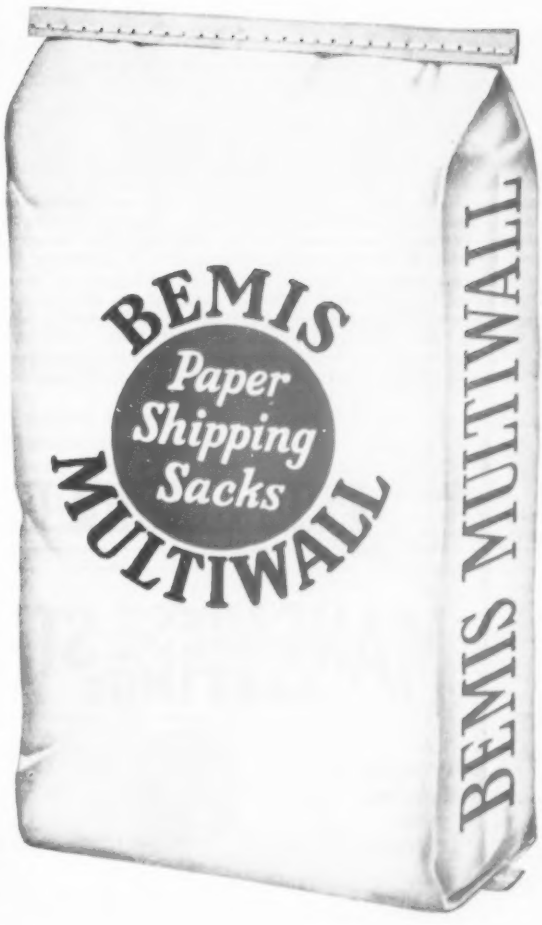
Want Proof?



then trust your own eyes!

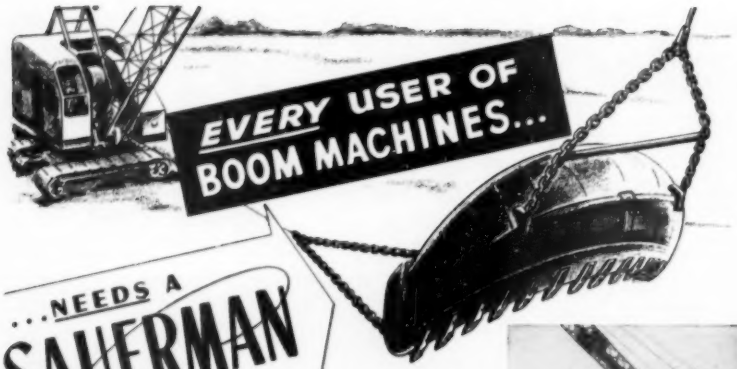
And you will know that Bemis color printing of brands on multiwall paper bags is bright, crisp, color-true . . . the kind that will boost the selling power of *your* brand.

Ask your Bemis Man to show you typical Bemis multiwall printing. Trust your own eyes.



Bemis

General Offices—St. Louis 2, Mo.
Sales Offices in Principal Cities



EVERY USER OF BOOM MACHINES...

...NEEDS A SAUERMAN Scraper!



Above, a 2½-cu. yd. Crescent scraper is used on a 1-cu. yd. boom dragline and the yardage rises to 270 cu. yd. per hour. The scraper is taking gravel from a roadside pit and delivering to a movable truck loader.



In this picture a Crescent scraper hangs from a trolley that rides on a track cable extending from the tip of the boom to an anchorage across the river. Thus, it is able to excavate far beyond the reach of the boom and haul material onto the bank.

A Sauerman Crescent Scraper will repay its moderate initial cost many times over when added to your boom machine as auxiliary equipment. Simple to rig up, it increases the machine's capacity when used on specific job operations mentioned below.

For backfilling, grading and other jobs where material must be moved but not lifted, the conventional casting method is used. The Crescent bites into and gathers the load with the ease of a plowshare, then hauls at ground level and deposits the load automatically when the forward pull is reversed. Machine strain and power consumption required to lift and swing the load to the discharge point are eliminated.

To dig material from a river, deep pit or soft area beyond the reach of the boom, another method is used to rig the Crescent Scraper to the boom machine. For such work the Crescent is suspended by chains from a simple trolley that rides on a track cable extending from the tip of the boom out to a movable anchorage. Digging, hauling and discharge proceed as in the casting operation. Following discharge, the empty scraper is lifted and gravity-returned to the excavation point merely by tightening the track cable.

Any boom machine will handle a Crescent of larger size than its regular dragline and clamshell bucket. The Crescent is much lighter, size for size, than these buckets. Digging power and strength are derived from the Crescent's bottomless construction and flowing lines—not from weight of metal. Users of boom machines can obtain full information by writing for illustrated literature describing how other operators use Sauerman Crescent Scrapers on their machines to increase output and reduce costs.



SAUERMAN BROS., INC.
530 S. Clinton St., Chicago 7, Ill.

ONE MAN MATERIALS HANDLING

SAUERMAN BROS., INC.

MANGANESE STEEL CASTINGS

for PULVERIZERS CRUSHERS ROLLS SCREENS

for SHOVELS DREDGES CRANES CONVEYORS

The Frog, Switch & Mfg. Co.

Established 1881 CARLISLE, PA.

trict of Columbia and part of Ohio, with headquarters in Washington, D. C. Ralph H. Dano, manager of No. 2 area since 1950, has been transferred to Area 4 office in Aurora, Ill., which includes Illinois, Indiana, Kentucky, Michigan and parts of Missouri and Ohio. He succeeds Bernard E. Lindstrom who has been made manager of the new market development section of the sales force.

Hercules Powder Co., Wilmington, Del., announces that J. B. Johnson has been elected a vice-president and member of the executive committee. He was formerly general manager of the explosives department and will be



J. B. Johnson



John M. Martin

succeeded in this position by John M. Martin, assistant general manager of the department. William R. Ellis has resigned as a member of the executive committee but will continue as a vice-president and director.

Sterling Electric Motors, Inc., Los Angeles, Calif., has appointed the following distributors: Giles Armature & Electric Works, Inc., Marion, Ill.; W. S. Bain Co., Newark, Ohio; Industrial Equipment Co., Joplin, Mo.; The Winkle Electric Co., Inc., Youngstown, Ohio; Wedell Electric Supply Co., Inc., Great Bend, Kan.; Electric Fixture & Supply Co., Salina, Kan.; Power Supply, Marshall, Texas; Erie Electric & Machine Co., Erie, Penn.; Martin Mill Supply Co., Stamford, Conn.; and Venino Bros., Newark, N. J.

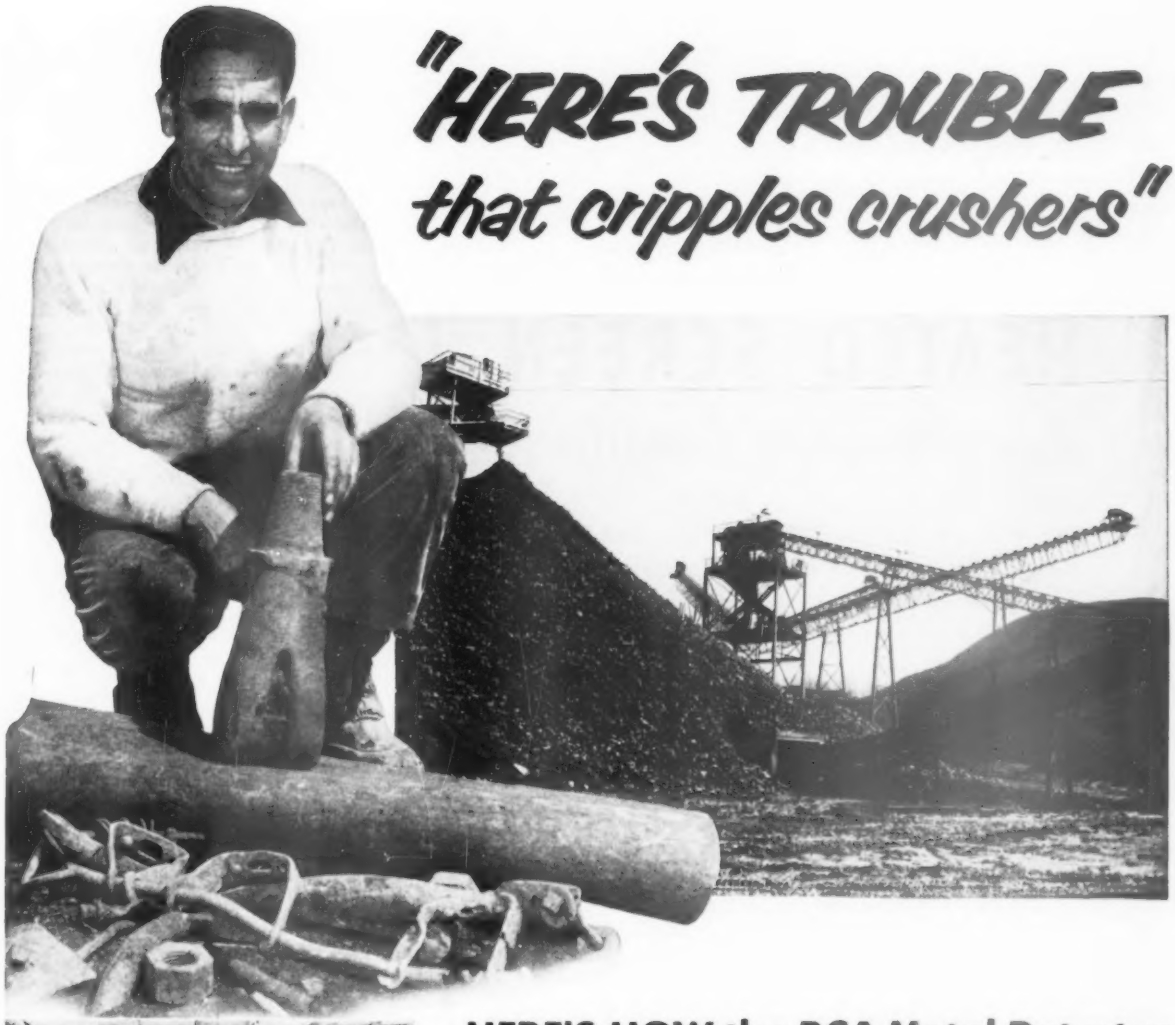
Cummins Engine Co., Inc., Columbus, Ind., announces the appointment of Wilmot Sandham as southwestern regional manager, with headquarters at Los Angeles, Calif. He replaces A. S. Leonard, who has resigned to operate a Cummins dealership in New Mexico and three counties of Texas. Mr. Sandham was formerly automotive and service engineer for General Petroleum Corp., Los Angeles.

Rust-Oleum Corp., Evanston, Ill., announces the appointment of the Seaboard Mill Supply Co., New Brunswick, N. J., and the E. Blankenship & Co., Inc., Marion, Ill., as distributors.

Nordberg Mfg. Co., Milwaukee, Wis., has announced the appointment of the Gochenaur Marine Co., Philadelphia, Penn., as distributor in eastern Pennsylvania, southern New Jersey, and Delaware.

Food Machinery & Chemical Corp., Los Angeles, Calif., announces the appointment of Everett W. Lundy as assistant sales manager of the Peerless pump division. He was formerly

"HERE'S TROUBLE that cripples crushers"





At Kingston Trap Rock Company, Kingston, N. J., the RCA Metal Detector is on the job, cutting shutdowns and saving crushers by preventing damage from tramp metal.

HERE'S HOW the RCA Metal Detector CUTS CRUSHER SHUTDOWNS

Extra-hard tool steels—bits, digger teeth, and other tramp metal—have ways of getting past even the most conscientious inspector—*but they can't escape the RCA Electronic Metal Detector.*

Installed on your conveyor, the RCA Metal Detector probes through rock to locate metals and alloys (including hard-to-detect manganese)—sounds an alarm or stops your conveyor—to keep trouble away from your crushers.

PAYS ITS WAY AGAIN AND AGAIN

By saving high-cost crusher replacements—by preventing the waste of shutdowns—the RCA Metal Detector can actually pay its way every day in the week. Start cutting shutdowns now—send for information today.

RCA

INDUSTRIAL PRODUCTS

RADIO CORPORATION of AMERICA

ENGINEERING PRODUCTS DEPARTMENT CAMDEN, N.J.

In Canada: RCA VICTOR Company, Limited, Montreal

RCA Engineering Products
Dept. 206V, Camden, New Jersey

Please send me information on the RCA Metal Detector.

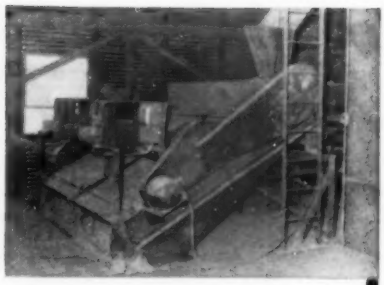
Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

The Enclosed Leahy



HEATED SCREEN

Meets Variable Conditions

The totally enclosed Leahy Screens above, with FlexElex electric heating of screen cloth, are proving their worth in a plant where screening conditions vary from dry to damp . . . day by day or even hour by hour.

When damp fines are screened, FlexElex keeps the mesh dry and wide open for full capacity, accurately sized production.

When dry or dusty material comes along, the enclosures keep dust under control.

Thus, the Leahy meets every fine mesh screening condition efficiently and economically.

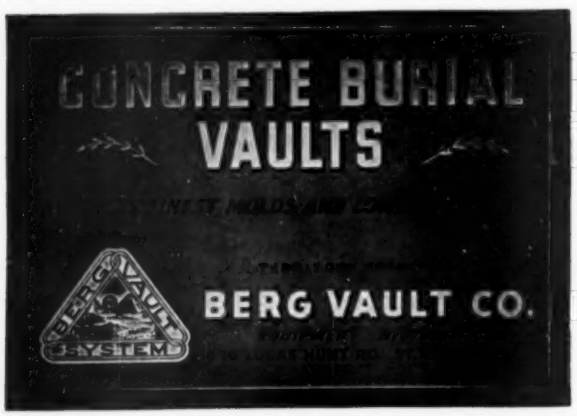
THE Leahy

Send for Bulletin 15-J . . . and ask especially for information about the new Model D with equalized screen tensioning.

THE DEISTER CONCENTRATOR COMPANY

The Original Deister Co., Incorporated 1906

915 Glasgow Avenue — Fort Wayne 3, Indiana



KEEP ABREAST WITH INDUSTRY TRENDS THROUGH ROCK PRODUCTS

Pacific district manager and will be succeeded in this position by Robert H. Hull, central district manager at Indianapolis, who will be succeeded by Waldo T. Harman, Chicago branch office manager.

Chain Belt Co., Milwaukee, Wis., announces that George D. Gilbert, secretary and division manager of the Baldwin-Duckworth division, has resigned after 35 years of continuous service, to devote more time to his personal affairs. William C. Messinger, assistant to the manager of the construction machinery division, has been elected secretary. Edward M. Rhodes has been promoted to division manager of the Baldwin-Duckworth division, to succeed Mr. Gilbert in that capacity. He was formerly assistant division manager and sales manager of the division. Roland V. Poisson succeeds Mr. Rhodes as sales manager of the division.

Lippmann Engineering Works, Milwaukee, Wis., has announced the appointment of Eddy & Co., Lansing, Mich., as distributor for the state of Michigan except the upper peninsula, and the Walton Equipment Co., Inc., New York, N.Y., as distributor for the general New York area and New Jersey.

Atlas Powder Co., Wilmington, Del., has announced that W. G. Frome, vice-president, member of the board and of the executive committee, has retired after 40 years of service with the company. D. J. C. Copps, who succeeded Mr. Frome as general manager of the explosives department in February, has been elected to the board and to the executive committee.

Bemis Bro. Bag Co., St. Louis, Mo., has announced the closing of the Jacksonville, Fla., plant. However, productive capacities at the New Orleans and Memphis plants are being increased to supply textile bag users in Florida and Georgia.

LeTourneau-Westinghouse Co., Peoria, Ill., announces that Joe H. Serkowich, advertising manager, has been named "Outstanding Young Advertising Man of 1952" by the Association of Advertising Men of New York City.

Caterpillar Tractor Co., Peoria, Ill., has appointed John G. Montag as assistant manager of the export department. He was formerly manager of the Trackson equipment and special projects division.

Cleaver-Brooks Co., Milwaukee, Wis., has announced the appointment of Hi-Way Equipment Co., Inc., Houston, Texas, as distributor for the road machinery division in 25 counties in southeastern Texas.

Hewitt-Robins, Inc., Stamford, Conn., announces that Thomas Robins, founder and chairman of the board, who pioneered the development of the belt conveyor in 1891, spoke at a recent dinner in honor of his 85th birthday. Mr. Robins predicted that the con-

NEW 4-WHEEL DRIVE Shoveloader

WORKS where other Loaders FAIL!





● This powerful new Shoveloader is designed and built for *HEAVY* work under the toughest conditions. Outstanding features—many of them exclusive—permit top capacity performance in extremely rough terrain, where other units falter and fail . . . Power from the heavy-duty gas or diesel engine is applied through positive 4-wheel drive, 5-speed transmission, forward and reverse . . . Positive 25" downcrowd, bucket width completely covering wheel tread, and operator control of tilt in any position, provide maximum digging and stripping effectiveness. Operator's position insures maximum visibility and safety.

Equipped with 1½ cu. yd. bucket as standard. Also available: 1¼ yard heavy duty and 2½ yard light material buckets, pallet forks, backfill blades and crane hook attachments.

Write for eight-page illustrated Bulletin AD-55, containing complete description and specifications.

1. Rear axle oscillates 23° about longitudinal axis for maximum ground pressure on all four wheels at all times. Hi-flotation type tires permit operation in soft or rough ground.

2. Positive 4-wheel, 5-speed transmission, and 100-inch wheelbase enable unit to negotiate steep earth banks, ramps or obstructions. Hydraulic power steer. Front or rear wheel steer optional. 4-wheel steer available.

3. 3 to 1 Planetary gear reduction in each of four wheels reduces torque 300% in axle shafts, gear case and drive shaft to prevent axle and drive line failure. 4 Planetary gears distribute load evenly to wheel-ring gears.

4. Unobstructed visibility enabling operator to see bucket in lowered position, increases safety and performance. Hydraulic arm-type loader has parallelogram action, with position lift and tilt controls.

Baker Lull
handling equipment

THE BAKER-LULL CORP.
Formerly the Lull Manufacturing Company
382 WEST 90th ST., MINNEAPOLIS 20, MINN.
A Subsidiary of the Baker-Raulang Co., Cleveland 2, Ohio

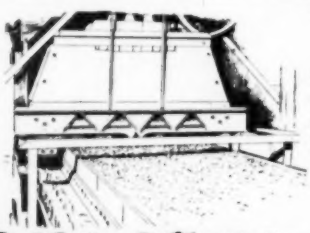
LIGHTWEIGHT AGGREGATE made better, more economically. by SINTERING

Lightweight aggregate produced by DWIGHT-LLOYD® Sintering machines combines superior performance characteristics with low manufacturing cost.

The aggregate offers up to 50% savings in costs as compared with other processes. It is light, strong and stable and is successfully used in a wide range of applications, including: lightweight concrete masonry units, monolithic concrete, pre-stressed concrete, built-up walls and roofs, etc.

THE DWIGHT-LLOYD® SINTERING MACHINE is available as standard equipment in a complete range of capacities. Low cost installations can be made, producing as little as 250 cubic yards per day. When greater output is required, additional 11' windbox sections can be added to the installation, at a fraction of the cost of a new machine, up to a capacity of 1000 cubic yards per day. These machines operate automatically, requiring a minimum of skilled labor for operation and maintenance.

Pilot Plant Tests your Materials. A pilot sintering plant is maintained for testing materials under actual production line conditions. We welcome the opportunity to discuss your problems, test your materials and submit our recommendations.



The Sintering Machinery Corp. also designs, engineers and erects entire lightweight aggregate installations. For details, write to:

LIGHTWEIGHT AGGREGATE DIVISION
SINTERING MACHINERY CORPORATION
135 SINTER AVENUE NETCONG, N. J.



Pulverizers

Have you investigated our new BRADLEY HERCULES MILL?
Unquestionably the last word in Economy and Simplicity.
(Send for New Catalog No. 59)

BRADLEY PULVERIZER CO.
ALLENTOWN, PENNA.

veyor industry will grow faster in the next 50 years than it has in the last half century.

International Harvester Co., Chicago, Ill., announces that H. E. Broadwell has been appointed western regional sales manager and Jack Bess, assistant sales manager, of Washington, Oregon, California, Nevada, Arizona, Idaho, Utah, Montana, Colorado, Wyoming, Hawaii and Alaska. L. A. Coomer has been named central regional sales manager with W. F. Hall as assistant sales manager, for Nebraska, South Dakota, North Dakota, Missouri, Illinois, Kansas, Texas, New Mexico, Oklahoma, Iowa, Minnesota, Mississippi, Wisconsin, northern Michigan, Louisiana, Arkansas and western Tennessee. E. L. Boughton has been appointed eastern regional sales manager and J. D. Gladden, assistant manager, for Indiana, Kentucky, Ohio, Michigan, eastern Tennessee, Alabama, Florida, Georgia, Pennsylvania, New York, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Delaware, Connecticut, New Jersey, Massachusetts, Rhode Island, Vermont, New Hampshire and Maine.

Chain Belt Co., Milwaukee, Wis., has announced the appointment of Richard M. Leek as Mid-Atlantic district representative for the construction machinery division in Pennsylvania, Virginia, West Virginia, Maryland, Delaware, Washington, D.C., and the southern part of New Jersey. His headquarters will be in Philadelphia, Penn.

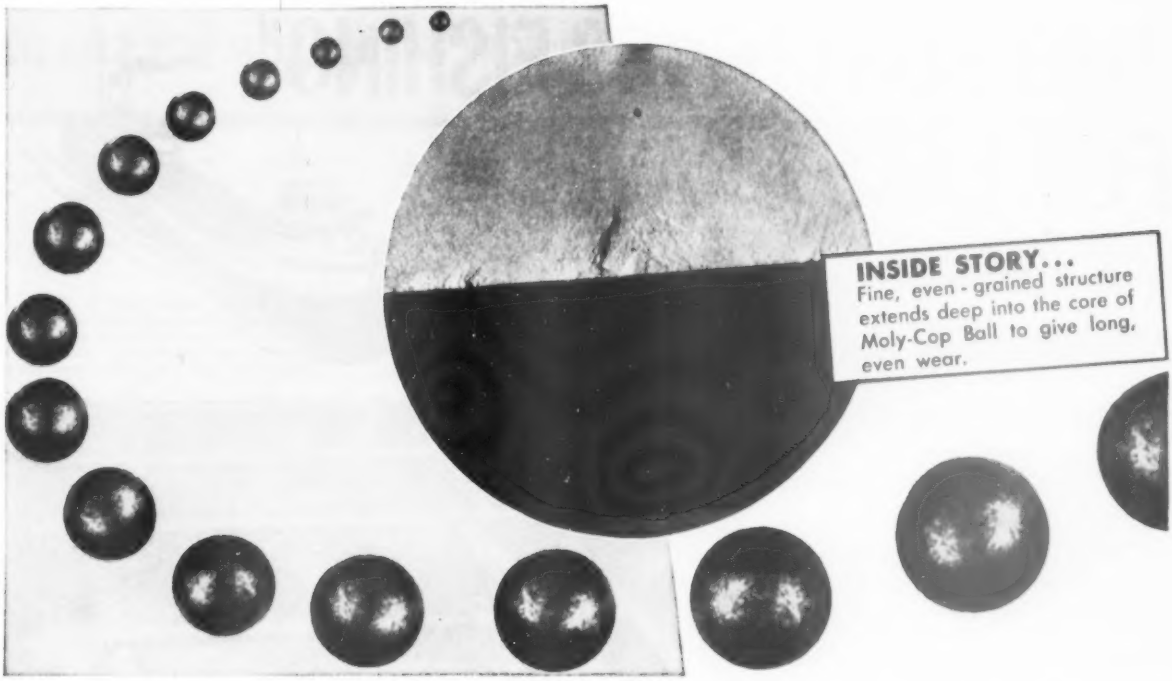
Chase Bag Co., Chicago, Ill., has appointed J. A. Brewster, manager of the Portland branch, as western regional sales director. J. H. Counce, manager of the New Orleans branch, has been named southern regional sales director; and J. P. Grady, manager of the Philadelphia branch has been made eastern regional sales director.

St. Regis Paper Co., New York, N.Y., announces that Hugh W. Sloan, vice-president of St. Regis Sales Corp., has become associated with St. Regis Paper Co. (Canada) Ltd. He will assist Thomas H. Cosford, vice-president and director of St. Regis Paper Co. and vice-president and managing director of the Canadian company.

LeTourneau-Westinghouse Co., Peoria, Ill., has reorganized its sales territories into eastern and western divisions. J. A. Vincent is eastern division sales manager, and F. W. Duke, former district sales representative, has been appointed western division sales manager.

Caterpillar Tractor Co., Peoria, Ill., has announced establishment of the engine division with H. H. Howard as manager. He was formerly director of domestic sales and will be succeeded in this position by W. S. Zeigler, who has been assistant director of domestic sales. A sales promotion department

(Continued on page 166)



If you want a finer grind . . . use a finer ball!

SHEFFIELD MOLY-COP

TRADEMARK REG.

COPPER-MOLYBDENUM-ALLOY

Grinding Balls

For fine grinding you want a ball that will give you the highest possible production rate with the lowest cost per ton of material ground . . . fewer chargings, less "down time."

Sheffield Moly-Cop Balls meet that requirement — because Sheffield's exclusive alloy and automatically controlled manufacturing methods produce a ball of finer, denser, more uniform structure. You get toughness and greatest resistance to abrasion. Moly-Cop Balls wear evenly, retain their spherical shape longer.

Tests have proved that Moly-Cop Balls wear up to 35% longer than alloy cast steel balls; up to 50% longer than best quality unalloyed carbon forged steel; and up to 120% longer than cast white iron balls. Considering initial costs and length of service, the net savings that result from the use of Moly-Cop Balls are substantial.



Used and proved around the world—*Sheffield engineers* are ready to prove the money-saving advantages of Moly-Cop Grinding Balls in your operation. Get in touch with us now.

SHEFFIELD
STEEL
CORPORATION
HOUSTON KANSAS CITY
TULSA
SUBSIDIARY OF ARMCO STEEL CORPORATION

Export Representatives: ARMCO INTERNATIONAL CORPORATION, MIDDLETOWN, OHIO

THIS BOAT "GOES FISHING" FOR LAKE GRAVEL

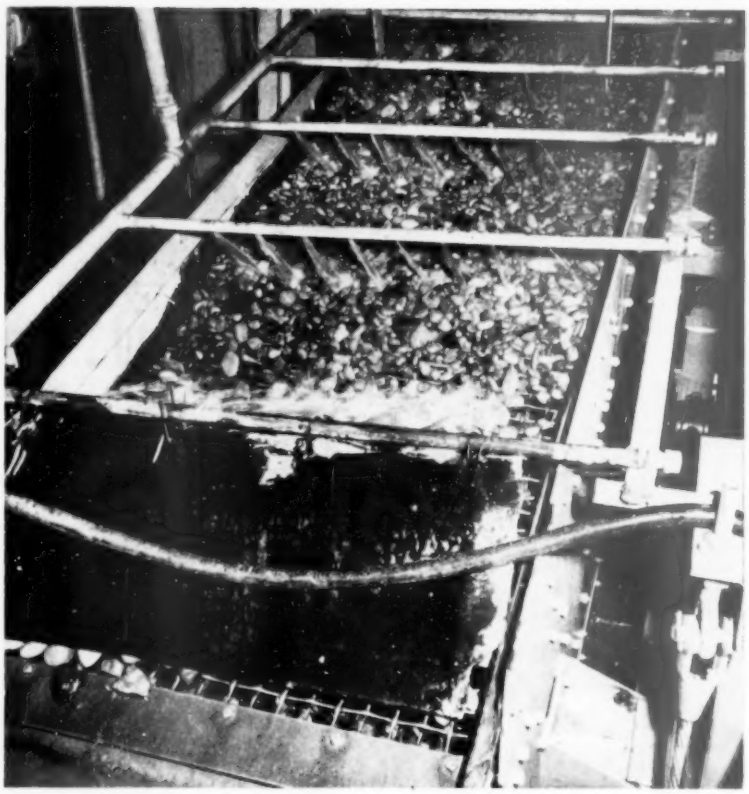


AND

SECO VIBRATING SCREENS

SIZE IT FOR MARKET

When Gravel Products Corporation's S. S. Niagara makes one of its daily trips from Buffalo to Erie Pa. into Lake Erie, it's out for a "big catch" of the finest sand and gravel to be found in this area. Instead of rods and nets however, this 270 foot sea-going craft is equipped with special equipment that draws the sand and gravel up from the lake floor at depths up to 80 feet. Special equipment separates the sand from the gravel and when the Niagara has a "catch" of 2,400 tons it heads homeward.



SECO
TRUE CIRCULAR ACTION
VIBRATING SCREENS

Put a dependable SECO on your screening job!

Over 300 models for screening everything from ag-lime to rip-rap

SEND FOR CATALOG No. 203 TODAY!

SCREEN EQUIPMENT CO., INC.
1750 WALDEN AVENUE, BUFFALO 25, N. Y.

Gravel Products Corporation's products are well known for quality throughout the Niagara Frontier and its yearly production runs into almost astronomical figures. *But even the finest gravel* must be accurately sized for complete customer satisfaction. That's why Gravel Products Corporation uses Seco vibrating screens exclusively. In the words of Mr. Ernest Hammond, "On this particular 3 deck Seco, we make four finished sizes and simultaneously rewash the gravel at the rate of 200 tons per hour (N. Y. State 1A's, 1's, 2's, and 3A's). For accuracy and dependable performance without excessive maintenance, we're absolutely sold on Seco. Another of our Seco's has served us faithfully for 12 years."

INFORMATION

You can obtain catalogs listed on these pages by merely checking and mailing the coupon below

TO HELP YOU MEET TODAY'S PROBLEMS AND TO MAKE PLANS FOR TOMORROW

1 AIR HEATERS—American Air Filter Co., Herman Nelson Div., has published a "Guide to the Selection and Use of Portable Space Heaters." The use of either gasoline or electronic powered portable heating devices for temporary heating on construction jobs, in industrial plants, etc., is discussed.

2 AIR HOSE—Quaker Rubber Corp. has issued a bulletin describing different industrial jobs for its line of air hose. Also included are cross section and cutaway photos, performance data, construction data, and specifications.

3 ARC WELDING—Air Reduction Sales Co. has released Catalog 1340 describing and illustrating various models of arc welding machines. Specifications, electrical data and lists of accessories and electrodes are also included in the catalog.

4 BAGGER — Richardson Scale Co. has available Bulletin 5301, describing and illustrating a semi-automatic gross bagger for weighing and bagging operations. Speeds, capacities and design features are discussed. A dimensioned engineering drawing is also included which shows the top and side views.

5 BIN LEVEL INDICATORS—The Bin-Dicator Co. has literature available on Bin-Flo aerator units and various bin level indicators. Illustrations, specifications, prices and construction details are given.

6 BLASTING — Industrial Seismology has available a booklet entitled "The Effect of Vibration From Commercial Blasting," which deals with the problems of vibration generated by explosives. Instruments used to measure vibration are described, and tabulations and charts give displacement, loading density, rock weights, resonance, etc. Photographic illustrations are also included.

7 BLOCK MACHINE — The Gene Olsen Corp. has brought out a four-page folder describing and illustrating the "King" and "Senior" plain pallet block machines. Dimensional drawings are included with detailed explanations of the features.

8 BLOWERS — Lamson Corp., Billmyre Blower Div., has published Bulletin B-6, a 32-page catalog describing its air blowers and exhausters, and gas blowers or boosters. Technical data, fundamental engineering laws for blower applications, pressure equivalent tables, specifications and operating features are given, as well as equipment photographs and line sketch drawings.

9 CENTRIFUGAL PUMPS — Worthington Corp. Centrifugal Pump Div., is offering Bulletin W-300-B4 covering its line of standard end suction centrifugal pumps. Charts illustrate the coverage provided by the six types of pumps.

10 CHAIN DRIVE LUBRICATION — The Texas Co. has available Vol XXXIX No. 8 of "Lubrication" featuring chain drive lubrication. Chain types and construction, conditions affecting lubrication, and lubricant selection are presented along with photographs and drawings showing construction details and various type chain drives.

11 CHAIN SPROCKET WHEELS — Link-Belt Co. has issued Book 2449 describing and illustrating a line of roller chain sprocket wheels with taper lock bushings. Tables list the stock sizes, and illustrations show how to install and remove the wheels.

12 CIRCUIT BREAKER—Westinghouse Electric Corp. has released Booklet B-5644 describing the "Quicklag" circuit-breaker panelboard. Design features are described.

13 CLASSIFIER — Western Machinery Co. has released a 20-page bulletin on the Wemco S-H classifier. Design features, performance characteristics, specification and capacity tables, and wet classification processing calculations are given for classifier units.

14 COMPRESSORS—Davey Compressor Co. has announced publication of Bulletin E-252 describing and illustrating Models 160 and 210 Super Chief portable compressors. Specifications and descriptions of various component parts are included.

15 CONCRETE CURING COMPOUND — Aluminum Industries, Inc. announced a bulletin on Permite concrete curing compounds PW-40 and W-95.

16 CONCRETE MIXER—Praschak Machine Co. has published a folder on its 50-cu. ft. concrete mixer. Features and prices are listed.

17 CONCRETE SURFACING — Carboline Co. has prepared Bulletin A-50 which describes Phenoline 300, a corrosion-resisting, surfacing material for concrete. Surface preparation, limitations, material requirements, etc., are included.

18 CONVEYOR BELT IDLERS—Link-Belt Co. has issued a 48-page booklet, No. 2416, picturing and describing over 500 belt conveyor idlers in 34 types. Schematic drawings and dimensional data are given for each type idler, and detailed information is provided for selection and spacing.

19 CRANE—Orton Crane & Shovel Co. has released Bulletin 85 describing the Aero-Crane with the GM Allison torque converter. Specifications and capacities are given.

20 CRANE TRUCK—Elwell-Parker Electric Co. has issued a folder describing Type CX-4, an electric-powered, two-wheel drive crane truck. Engineering drawings give detailed specifications and operating and construction features are described. Typical application photographs are also included.

21 CRUSHERS—Pennsylvania Crusher Co. has published a booklet giving information on various crusher operations. Power consumption, parts wear, maintenance costs and uniformity of product are included. A check list is provided for determining the crusher best suited to specific jobs. Also discussed are various type hammermills, impactors, granulators, gyracones, etc.

22 DRYERS—Denver Equipment Co. has released Bulletin D4-B3 describing the "Standard" dryers, including installation data and operational features. Typical drying data is given for a variety of materials.

23 ELECTRODES—Air Reduction Sales Co. has available a 50-page pocket guide describing Airco electrodes. Mechanical properties, testing information and specifications are included.

24 ELECTRONIC CONTROL—The Bristol Co. has published Bulletin B226 describing and illustrating the latest additions to the Series 500 line of free-vane electronic controllers for indicating or controlling temperature, pressure, flow, liquid level, humidity and time programs. The frequency modulation principle is described while application examples and engineering specifications are also included.

25 ENGINES—Caterpillar Tractor Co. has announced Form 30724 illustrating and describing its various type engines at work in sand and rock processing plants. Also included are model views of 10 different lines of products for quarry operations.

26 FASTENERS AND NUTS — Security Locknut Corp. has issued a booklet describing and illustrating the "Locknut" for various applications and the "Studloc" for locking tappet adjusting screws, cylinder head studs, housing covers and flange studs in place. Specifications are also included.

27 FORK LIFT TRUCK—The Baker-Raulang Co., Baker Industrial Truck Div., has published Bulletin 1344 describing and illustrating the "Gas-O-Matic" fork lift truck. Complete dimensions and specifications are included.

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28 FORK LIFT TRUCKS—The Buda Co. has issued Bulletin 1642 describing the operation, construction and servicing features of the FT Series of fork lift trucks from the driver's point of view. Other materials handling equipment including platform trucks, industrial tractors, etc. are also presented.

29 FRONT-END LOADER—Baker-Lull Corp. has released Form No. A5202-1 giving complete specifications for its 4B front-end loader mounted on various models of Sheppard industrial-type tractors. Materials handling tools available with the Shoveloader are described along with the Sheppard fuel injection system.

30 HEAVY-MEDIA SEPARATION—American Cyanamid Co., Mineral Dressing Div., has published a 32-page bulletin entitled, "Heavy-Media Separation Processes for Mineral Concentration." Descriptions of representative heavy-media plants are included as well as drawings and typical application and equipment photographs.

31 INDUSTRIAL EQUIPMENT—Stephens-Adamson Manufacturing Co. announced the availability of Bulletin 653 which gives a listing of the units available from the recently formed S-A Standard Products Div. Car loaders, pullers and spotters, winches, bin valves, belt conveyor carriers etc. are included in the bulletin.

32 INSTRUMENTATION — Minneapolis-Honeywell Regulator Co., Industrial Div., has announced Vol. 6 No. 3 of "Instrumentation" which tells how Standard Oil of Indiana keeps more than 36,000 instruments, valves and control devices in operating condition. The use of instruments in guided missile research, information on strain gauges, thermo-couples, and extension wire, etc. are also included in the volume.

33 LIFT-TRUCK—Elwell-Parker Electric Co. has published a folder describing a gasoline-powered low-lift truck, Type GEP-6. Engineering drawings give detailed dimensions while operating and construction features are described. Typical application photographs are also included.

34 LIFT-TRUCKS—Hyster Co. is offering the fifth edition of "How to Operate a Lift Truck" for both the beginner and the experienced operator. Preventive maintenance, safety and basic materials handling information is given. Drawings for setting up an obstacle course are also included.

35 LOADING RAMPS—Magline, Inc. is offering Bulletin DB-211 describing its line of eight standard, lightweight, magnesium, mobile loading ramps. Data on its magnesium bridges, drawbridges and catwalks is also included.

36 LUBRICATION—The Farval Corp. has issued Bulletin 26 describing and illustrating its centralized lubrication equipment, such as measuring valves, pumps, spray valves, etc. Typical application photos are given as well as illustrations of fittings and accessories.

37 LUBRICATION — The Texas Co. has available Vol. XXXIX No. 7 of "Lubrication," describing the uses of lubricated flexible couplings. Types of couplings, lubrication requirements and installation and maintenance data are given. Line drawings and photographs point out assembly and installation details.

38 MASONRY SURFACE COATINGS — Bakelite Co. has released an eight-page brochure, VC, describing masonry surface coatings based on Bakelite and Vinylite resins. Advantages, application data and service test results are given. Application photographs are also included.

39 MASONRY PAINT — Medusa Masonry Paints, Court Square Bldg., Baltimore 2, Md., has released the third edition of a 32-page, illustrated booklet on correcting damp basement problems and giving decorating suggestions. The 16 paint colors available are also shown. (Copies are available from the company at the above address: free to Medusa dealers; 25¢ to non-dealers).

40 METERS AND CONTROLS—Bailey Meter Co. describes in Bulletin 17 its complete line of instruments for metering and automatically controlling 17 process variables. Ranges and specifications are also given.

41 MOTOR STANDARDS—General Electric Co. has available Bulletin GEA-5995 giving the N.E.M.A. standard frame dimensions for a-c motors from 1 to 30 hp. A comparison of the old with the new frame assignments for open-type poly-phase, single-phase, and wound-rotor motors is also included.

42 MOTORS AND GENERATORS—General Electric Co. has available Bulletin GEC-972 describing its motor service plan for fractional and integral horsepower motors and generators. The type of service provided, service warranties, motors covered by the plan and fractional horsepower motor factory repair service are explained.

43 PROPORTIONING SYSTEM — Richardson Scale Co. has released Bulletin 0351 describing and illustrating the "Select-O-Weigh," a proportioning and materials handling system for automatically making up formulated mixes of bulk products. Rates, accuracies, electronic control operation and the possibilities of remote recording are explained. A schematic drawing of the machine is included as well as illustrations of five scales.

44 SCREENS — Simplicity Engineering Co. has announced publication of a 28-page illustrated catalog describing its complete line of screens, feeders and conveyors. Gyrating, horizontal, tray-type, ball-type, and dewatering screens are among those described. Specifications and capacities are also included.

45 TESTING AND PLANNING SERVICE—Denver Equipment Co. has released Bulletin G-5307, describing its services in testing ores, designing flowsheets and mills, selecting equipment and providing field service. Various types of equipment are also illustrated.

46 TRACTOR—Caterpillar Tractor Co. has issued Form 30728 illustrating and describing the Cat DW20 wheel-type tractor. Typical application photographs are shown.

47 TRANSFORMER—Westinghouse Electric Corp. has issued an eight-page booklet, B-5812, describing and illustrating the Type E, totally-enclosed, non-ventilated, dry-type transformer. Construction details are discussed, as well as data on reduced maintenance costs.

48 VARIABLE SPEED DRIVES—Westinghouse Electric Corp. has available a 16-page booklet, B-5808, giving construction and operational data and typical applications of packaged adjustable-voltage drives for variable speed applications.

49 V-BELTS—Durkee-Atwood Co. has released a 60-page engineering catalog on industrial V-belts and their applications. Increased horsepower ratings are listed for standard and Hy-Load V-belts. Standard sheave sizes and groove dimension sheaves are also given, along with engineering information and drive tables.

50 WINCHES AND CAR PULLERS—Stephens-Adamson Manufacturing Co. has available Bulletin 753 describing its car pullers, and Bulletin 853, on its hand and motor winches. Drawings and typical application photographs are included in both as well as specifications and other details.

51 WIRE ROPE—Sauerman Bros., Inc. has available a six-page brochure on wire rope fittings. Blueprint drawings, tables and ordering information on open and double wedge sockets, pins and continuous cable clamps are given as well as typical application photographs and data.

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51									

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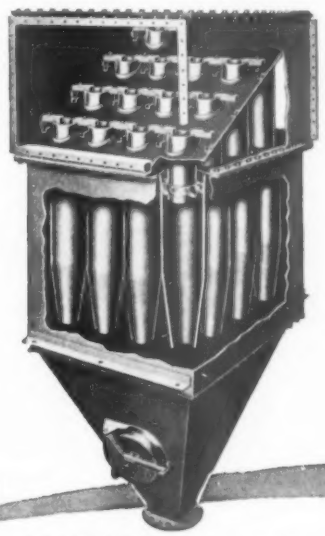
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Before you buy *any* equipment for recovering dust . . .



COMPARE ALL OTHERS against MULTICLONE'S Multiple Advantages

Because the advantages of MULTICLONE are so clear-cut, so vitally important, so far-reaching in the savings they make, we urge you to make a factual unbiased comparison of MULTICLONE dust collection equipment against *any other* in the mechanical recovery field. Only by making such a comparison can you fully appreciate the major savings and greater performance you get by installing MULTICLONE Collectors!

COMPARE Recovery Efficiency!

It is a recognized fact that the separating efficiency of a cyclonic tube *increases* as the tube diameter *decreases* because smaller tubes generate greater centrifugal forces. The patented vane in the MULTICLONE makes the use of small tubes *practical* without complicated manifolding and permits compacting many small tubes into one simple, highly efficient unit. MULTICLONE's higher centrifugal forces throw out not only the large, medium and small particles, but also an unusually high percentage of the *extremely small* particles of 10 microns and less. Result—*more complete recovery of all suspended particles from the gas stream!*



COMPARE Space-Saving Compactness!

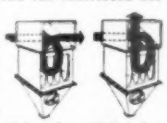
Plant space costs money—particularly at today's high construction costs. Because the MULTICLONE is more compact, size for size, it makes *really important* savings in space and plant costs. Note in the chart how the MULTICLONE requires substantially less space—*both in floor space and cubic space*—than any other unit of comparable capacity and performance. *This means vital savings in construction costs!*

Make	Relative Space Requirements In Sq. Ft.	In Cu. Ft.
Multiclone	1.0	1.0
Collector A	2.1	1.8
Collector B	5.9	3.2
Collector C	6.8	3.9

COMPARE Dollar-Saving Adaptability!

Savings in space is just one of many ways MULTICLONE reduces installation costs. Because the shape of the unit can be readily varied (long and narrow, short and wide, or square) to fit available spaces, the MULTICLONE can often be tucked into odd corners and waste areas too restricted for other equipment.

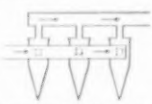
Moreover, inlet-outlet ducts can be varied—side-inlet side-outlet, or side-inlet top-outlet—to meet low headroom or restricted side clearance requirements . . . and the single-inlet single-outlet duct design permits greater flexibility and simpler installation. *These all add up to vital savings in installation costs!*



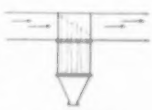
Side inlet, Side outlet ***Side inlet, Top outlet***

COMPARE All-Around Simplicity!

The MULTICLONE is simple and inexpensive to maintain because there are no highspeed moving parts to repair or replace . . . no pads or filters to clean or renew . . . nothing to choke the gas flow or increase draft losses as suspended materials are recovered. In addition, the square, flat-sided shape of the MULTICLONE and its straight inlet and outlet ducts are far simpler to install and insulate. And since the recovered material from an entire bank of tubes is collected in a *single* hopper, it is much easier to service and maintain than the multiple hoppers of conventional cyclone units. *Here again, the MULTICLONE saves in many ways—all of them important!*

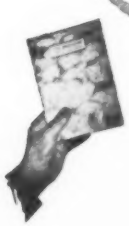


Conventional Cyclone



Multiclone

Whether your recovery installation is in a new structure or for modernizing present equipment, you will be far ahead by installing MULTICLONE Collectors. Our experienced engineers will gladly make helpful suggestions for simplifying your recovery problems. A letter, wire or call to our nearest office places this assistance at your service without obligation.



Send for Helpful Literature! This factual MULTICLONE literature explains the basic principles of cyclonic dust recovery and gives technical data helpful to anyone contemplating a dust or fly ash recovery installation. Write today for your free copy!

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ENGINEERS, DESIGNERS & MANUFACTURERS OF EQUIPMENT FOR COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

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INCREASE YOUR SALES

OF "AG-LIME"

by Recommending the "NEW LEADER"

"NEW LEADER" Scores 10 FIRSTS

1. First successful truck mounted lime spreader to handle stockpile lime satisfactorily.
2. First successful lime spreader with a chain conveyor.
3. First lime spreader built with Twin Distributor Discs.
4. First lime spreader with successful center dump.
5. First lime spreader with back endgate swinging wide open.
6. First lime spreader with running boards or catwalks as standard equipment.
7. First lime spreader with a 24" wide conveyor trough.
8. First spreader with an all-steel frame and wooden hopper.
9. First lime spreader with a successful attachment for spreading bulk or sacked fertilizer.
10. NOW — the first commercial fertilizer spreader with distributor discs driven at constant speed by separate motor. Conveyor chain synchronized with speed of rear truck wheels, assuring full width of spread at all times and uniform distribution.

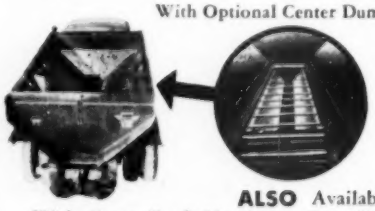
Provides Most Even, Positive Spread on the Market Today!

Combination Limestone and Fertilizer Spreader



Gives you year 'round operation hauling and unloading road stone, gravel, etc.

With Optional Center Dump



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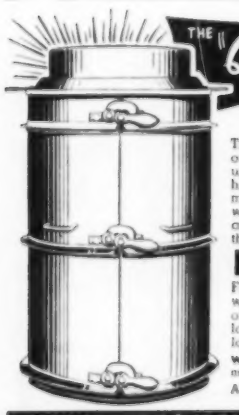
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Manufacturers of the World's Most Complete Line of Spreaders and Bulk Material Delivery Equipment



THE "Quinn Standard"

FOR CONCRETE PIPE

The Quinn Standard is known as the best the world over, wherever concrete pipe is produced and used. Backed by over 35 years' service in the hands of hundreds of Quinn-educated contractors, municipal departments and pipe manufacturers who know from experience that **Quinn pipe forms** and **Quinn mixing formulas** combine to produce the finest concrete pipe at lowest cost.

QUINN HEAVY DUTY PIPE FORMS

For making pipe by hand methods by either the wet or semi-dry processes. Built to give more years of service—sizes for pipe from 10" up to 120" and larger—tongue and groove or bell end pipe at lowest cost.

WRITE TODAY. Complete information, prices, and estimates sent on request.

Also manufacturers QUINN CONCRETE PIPE MACHINES

QUINN WIRE & IRON WORKS 1603 12TH ST. BOONE, IA

KEEP ABREAST WITH INDUSTRY TRENDS THROUGH ROCK PRODUCTS

Manufacturers' News

(Continued from page 160)

has also been announced, managed by W. K. Cox, advertising manager, and will include the sales training division, sales development division and advertising department.

Chain Belt Co., Milwaukee, Wis., has announced the appointment of A. R. Abelt as vice-president of sales, in which capacity he will be responsible for general sales policies, sales



A. R. Abelt



George W. Woodland

promotion activities and methods of distribution and marketing for all divisions of the company, also export sales. A native of Milwaukee, Mr. Abelt joined Chain Belt in 1906.

George W. Woodland has been appointed manager of field forces for the industrial divisions. He was formerly sales manager of the chain and power transmission division. Mr. Woodland started with Chain Belt in 1938 as a student apprentice.

Gilbert J. Schuelke, formerly assistant sales manager of the chain and transmission division, has been made sales manager of the division. He



Gilbert J. Schuelke



W. C. Messinger

joined the company in 1936 as a chain engineering apprentice and has served as a sales engineer in several district offices.

W. C. Messinger has been appointed assistant to A. K. Thomas, divisional manager of the construction machinery division. He was formerly manager of the ordnance division and will be succeeded in this position by R. V. Krikorian, who has been his assistant.

Union Wire Rope Corp., Kansas City, Mo., has established an eastern division comprising 15 states, including Ohio on the west and Tennessee and Virginia on the south. L. A. Price has been appointed division manager. R. D. Tripp, formerly district salesman, succeeds Mr. Price as district manager at Ashland, Ky. L. A. Davis, formerly Ohio representative, becomes district manager at Columbus. Robert

ERIE PORTABLE TRUCK MIXER CUTS COSTS, STREAMLINES MOHAWK PAVING CO.'S OPERATION!

One-man Operation Produces as Much as Previous Set-up Needing Two Units and Three Men! Loads Mohawk's Mixer Trucks with Four Cu. Yards in Three Minutes!



One man operates this GTES-79 Erie bin and weighing Aggremeter for Mohawk. Their own men set it up because it comes in well-engineered, easy-to-assemble sections. Over-the-road hauling is easy for the same reason. Capacity is 80 yds. of specification concrete per hour.

SOLD BY

DOW & CO. BUFFALO, N. Y.

In the Summer of 1952, the Mohawk Paving Co. of Geneva, N. Y. was completely destroyed by fire. In rebuilding the operation, Leonard Liberto, president, chose an Erie Portable Truck Mixer Plant to replace the demolished equipment.

"We chose Erie," says Mr. Liberto, "because it cut down overhead and increased our production. "One man does the work formerly done by three. And it was easy to assemble. Our own employees did the work. High quality materials in the equipment and expert workmanship were additional reasons."

Before buying a portable batching and mixing plant, let us tell you the facts about Erie.

Cable Address: EXIMPORT *Write for* Booklet GS, Dept. P103.

ERIE

STEEL CONSTRUCTION COMPANY

4103 GEIST ROAD • ERIE, PENNSYLVANIA



Fig. 1. Reclaims crowfoot. *Worn areas are first built up with mild steel "Fleetweld" electrode and then hardsurfaced with Lincoln "Abrasoweld".*

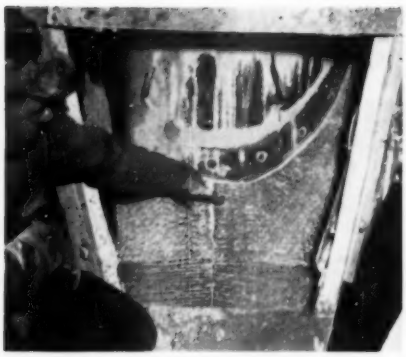
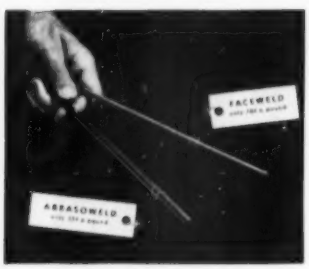


Fig. 2. New face for chute *surfaced with Lincoln "Faceweld" resists severe abrasion and impact from aggregate falling five feet onto chute.*

PROOF THAT QUALITY HARDSURFACING DOES NOT HAVE TO BE HIGH PRICED



GET FREE HARDSURFACING GUIDE

Gives procedures for hardsurfacing essentially every type of requirement. Write on your letterhead to Dept. 3405. Ask for Bulletin 469.

Theory: Hardsurfacing must cost a lot or it doesn't have the alloys to give proper wear under impact and abrasion. (This is not true and here's why.)

Fact: Lincoln "Abrasoweld" is a high carbon-chromium alloy, yet sells for only 25¢ a pound . . . about a third the price of other hardsurfacing.

Fact: Lincoln "Faceweld" has chromium-carbide crystals for severe abrasion and impact . . . but sells for 60 to 70 cents a pound. Comparable rods cost $2.60 a pound.

Lincoln's wear resistance equals and, more often, exceeds other hardsurfacing. So why pay the high prices?

ONLY TWO RODS — But they answer 9 out of 10 hardsurfacing jobs. Lincoln's "Abrasoweld-Faceweld" team simplifies inventory . . . saves money on every job.

THE LINCOLN ELECTRIC COMPANY
CLEVELAND 17, OHIO
THE WORLD'S LARGEST MANUFACTURER OF ARC WELDING EQUIPMENT

T.C.
WOVEN WIRE SCREENS
ACCURATE • DURABLE • ECONOMICAL

The reliability of T.C. Alloy Screens has carried them into all parts of the world. Made in Standard and Special Weaves, with Square or Oblong Openings — from 10 mesh, .035" wire on up. Write today for Catalog No. 53.

TWIN CITY IRON & WIRE CO.
35 W. WATER STREET • ST. PAUL 1, MINNESOTA

KEEP ABREAST WITH INDUSTRY TRENDS THROUGH ROCK PRODUCTS

K. Cooke, formerly representative in Pennsylvania, Maryland and West Virginia, has been made district manager with headquarters in Pittsburgh. D. E. Bedford continues as district manager at Albany, N.Y. J. R. Wells has been added to the sales staff at Ashland, Ky.

International Harvester Co., Chicago, Ill., has announced the following appointments: I. P. Payne, manager of industrial power sales; C. E. Jones and W. M. Holland, assistant managers of sales; L. J. Lange, general supervisor of sales development; E. A. Braker, general supervisor of sales engineering; and W. W. Black, general supervisor of service and parts merchandising.

Poor & Co., Chicago, Ill., has announced the election of Victor C. Armstrong as chairman of the board to fill the vacancy occasioned by the death of Fred A. Poor, and also the appointment of N. Rulison Knox as assistant to the chairman of the board. Mr. Knox was formerly vice-chairman of Bucyrus-Erie Co., South Milwaukee, Wis.

The King Powder Co., Cincinnati, Ohio, has announced the retirement of Frank P. Morse as sales manager and the appointment of D. H. Weber to succeed him. Mr. Morse served as sales manager for 34 years and Mr. Weber was formerly assistant sales manager.

Koehring Co., Milwaukee, Wis., announces that R. E. Bansemer has been named sales manager of its subsidiary, Parsons Co., Newton, Iowa. He was formerly assistant sales manager of Koehring and will be succeeded in this position by M. O. Messenger, sales manager at the Iowa plant.

Soil Testing Services, Inc., has opened a new office and testing laboratory at 3529 N. Cicero Ave., Chicago, Ill. Activities of the concern are under the direction of John P. Gnaedinger, president, and Carl A. Metz, vice-president. Other sales offices are located in Milwaukee, Wis., and Portland, Mich.

Barrett-Cravens Co., Chicago, Ill., has announced construction of a $1,000,000 manufacturing plant and office building at Northbrook, Ill., which will combine operations of the two plants located in Chicago and part of the operations of the Crescent Truck Co., a subsidiary in Lebanon, Penn.

The Colorado Fuel & Iron Corp., New York, N.Y., announces that a new district sales office and warehouse has been opened by the Wickwire Spencer steel division in New Orleans, La., with Ford L. Brooke as district manager.

Combustion Engineering, Inc., New York, N.Y., has announced the death on June 18 of Albert W. Raymond, European manager in Paris, France.

Harbison-Walker Refractories Co., Pittsburgh, Penn., has announced the following appointments: C. A. Brashares and Richard S. Moore, assistant

AUDITED PAID CIRCULATION
ABC

The Hallmark of Circulation Value

Three thousand four hundred and fifty advertiser, agency and publisher members of the Audit Bureau of Circulations have a voice in establishing and maintaining the standards responsible for the recognition of this emblem as the Hallmark of Circulation Value. It represents the standard of value that these buyers and sellers of advertising space have jointly established as measurement for the circulation of printed media.

The basis for arriving at the advertising value of a publication is the Bureau's single definition of net paid circulation. With this as the standard, the circulation records of A.B.C. publisher members are audited by experienced circulation auditors. As specified in the Bureau's Bylaws, A.B.C. auditors have "access to all books and records."

Subscription and renewal orders, payments from subscribers, paper purchases, postal receipts, arrears are among the publisher's circulation records that are painstakingly checked by auditors and the resulting data are condensed and published in A.B.C. Reports.

Experienced space buyers use the audited information in A.B.C. Reports as a factual basis for their decisions in evaluating, comparing and selecting media. The FACTS in A.B.C. Reports for business publications include: • How much paid circulation • How much unpaid distribution • Occupational or business breakdown of subscribers • Where they are located • How much subscribers pay • Whether or not premiums are used • How many subscribers in arrears • What percentage of subscribers renew.

SEND THE RIGHT MESSAGE TO THE RIGHT PEOPLE

Paid subscriptions and renewals, as defined by A.B.C. standards, indicate an audience that has responded to a publication's editorial appeal. With the interests of readers thus identified, it becomes possible to reach specialized groups effectively with specialized advertising appeals.



This publication is a member of the Audit Bureau of Circulations and is proud to display the Hallmark of Circulation Value as the emblem of our cooperation with advertisers. Ask for a copy of our A.B.C. Report and then study it.

ROCK PRODUCTS

A.B.C. REPORTS—FACTS AS A BASIC MEASURE OF ADVERTISING VALUE

PYRASTEEL

SEGMENTAL KILN ENDS FOR CEMENT PLANTS

. . . proven satisfactory in THOUSANDS of Installations

Avoid burnouts and shutdowns, and insure years of continuous service, by equipping your kilns, both feed and discharge ends, with PYRASTEEL Segmental Kiln Ends.

PYRASTEEL is equally effective and economical in many other high-heat applications, including clinker coolers, conveyor screws, feed pipes, and drag chains.

Over three-quarters of the annual cement output is produced in plants using either or both of our alloys, PYRASTEEL and EVANSTEEL.



PYRASTEEL KILN END, Discharge end

Unit Segments are easy to install or replace



Write for PYRASTEEL Bulletin

CHICAGO STEEL FOUNDRY CO.

Kedzie Avenue and 37th Street • Chicago 32, Illinois

Makers of Alloy Steel for Over 40 Years



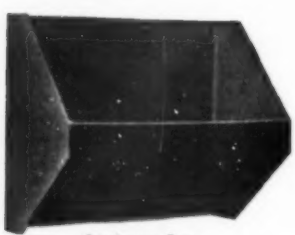
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High Material Handling Costs

Specify Super-Service

STANDARD

STEEL ELEVATOR BUCKETS



Continuous Type (Style No. 2 shown)



Salem Type

Write Today. You will approve our Prices and our Service

STANDARD Steel Buckets "stand up like champions" in resisting abrasion and corrosion.

Rigidly built of top-grade steel. Reinforcing strip may be welded to bucket lip, and hard surface rod added, to insure extra service life.

High-economy STANDARD Buckets are available in all styles, types, sizes and gauges.

We are equipped to furnish new units or recondition present equipment at minimum cost.

The Standard Metal Mfg. Co. SINCE 1921

STANDARD METAL MFG. CO.

110 CENTER ST., MALINTA, OHIO

general sales managers; George M. Ullom, sales manager of the Birmingham district; and Joseph D. Custer, sales manager of the Portsmouth, Ohio, district.

Koehring Co., Milwaukee, Wis., has announced the death on August 28 of Eric H. Lichtenberg, patent research engineer for the last 13 years, after an illness of five months. He was 68 years old and had been associated with Koehring for 42 years. Mr. Lichtenberg was holder of several hundred patents on concrete mixing, paving and other construction machinery now in use throughout the country.

Frank G. Hough Co., Libertyville, Ill., has appointed Jack C. Bever as district representative in the District of Columbia, Maryland, Virginia, West Virgina and North and South Carolina. Dwain Richey has been made district representative in Arkansas, Louisiana, Oklahoma, Texas and New Mexico.

Marion Metal Products Co., Marion, Ohio, is celebrating its 30th anniversary as manufacturer of dump bodies and hoists. History of the company is traced in a recent issue of its new magazine publication "Dump Body Business." Gilbert E. Herr is president and general manager, and J. L. Halberstein is chairman of the board.

Electric Storage Battery Co., Philadelphia, Penn., has announced the establishment of an industrial products division with Roland Whitehurst, vice-president and director, as general manager, and also an automotive products division with Robert L. Sommerville as general manager.

Harnishfeger Corp., Milwaukee, Wis., announces that operations of the diesel engine division have been moved to the new plant in Crystal Lake, Ill. Frank C. Edwards has been appointed general manager of the division. He was formerly sales manager of the small excavator division.

Barber-Greene Co., Aurora, Ill., has announced the appointment of Mine & Smelter Supply Co., Denver, Colo., as distributor in the entire state of Utah plus the counties of Trenton, Sublette, Uinta, Sweetwater and Lincoln in Wyoming.

The Euclid Road Machinery Co., Cleveland, Ohio, has announced the appointment of John C. Dix as district manager for Georgia, Alabama, Florida and the eastern part of Tennessee, with headquarters in Atlanta, Ga.

C. S. Johnson Co., Champaign, Ill., a subsidiary of Koehring Co., Milwaukee, Wis., has opened a sales branch in Stockton, Calif., with Harold Buckler as manager, assisted by Robert Ronyak and Jack Shoemaker.

Baldwin-Lima-Hamilton Corp., Construction Equipment Div., Lima, Ohio, has appointed the Osborne Equipment Co., Knoxville, Tenn., as distributor in the Tennessee counties of Franklin, Grundy, Van Buren, Cumberland, Fen-

tress and Pickett, and Georgia counties of Dade, Walker, Catoosa, Whitfield and Murray.

Chase Bag Co., Chicago, Ill., announces that W. J. Muller has been appointed manager of the Orlando sales office. Formerly branch manager in Kansas City, Mr. Muller succeeds Ralph Farnham, who has been transferred to the promotion department in Chicago.

Chain Belt Co., Milwaukee, Wis., has purchased the controlling interest in Crothers Engineering, Ltd., Toronto, Ont., Canada, which will be operated as Canadian Chain Belt, Ltd., for production of its Rex truck-mounted concrete mixers.

Raybestos-Manhattan, Inc., Passaic, N. J., has announced the death on August 27 of Littleton C. Barkley, general sales manager of the West Coast division. He was 51 years old and had been with the company since 1926.

The Euclid Road Machinery Co., Cleveland, Ohio, has appointed the Colorado Builders' Supply Co., Denver, Colo., as distributor in Colorado, most of Wyoming and 11 western counties of Nebraska.

Hercules Powder Co., Wilmington, Del., announces that Theodore Marvin, director of advertising, has resigned to become president of the Michigan Chemical Corp., St. Louis, Mich. He had been with Hercules for 30 years.

Wooldridge Mfg. Co., Sunnyvale, Calif., has appointed Southwood Machinery Sales, Indianapolis, Ind., as distributor in Indiana with the exception of the counties of Lake, Porter and Laporte.

Caterpillar Tractor Co., Peoria, Ill., has announced the appointment of Burt Powell as advertising manager. He succeeds W. K. Cox who has been named manager of the sales promotion department.

American Brake Shoe Co., New York, N. Y., announces that Thomas E. Akers has been elected chairman of Dominion Brake Shoe Co. Kenneth T. Fawcett has been named president and Maynard B. Terry, vice-president.

The Falk Corp., Milwaukee, Wis., has announced the appointment of Franklin C. Williams as manager of sales promotion and advertising, and A. H. Kelley as assistant manager.

Flexible Steel Lacing Co., Chicago, Ill., has announced the appointment of John Marshall, Portland, Ore., as sales representative in Oregon and Washington.

Mack Trucks, Inc., New York, N.Y., has announced the death on September 5 of Fred W. Sommer, vice-president and treasurer.

Winslow Engineering Co., Oakland, Calif., has opened a new sales office and plant in Murray, Ky., under the direction of W. Ray Kern, general sales manager, who has moved to



HIGH SPEED PRODUCTION is routine with a Nelson! Sand, gravel, broken stone (up to 3" cube), lime, gypsum, etc., can be loaded at up to 4 cu. yds. per min. Users report day after day production of over 1,000 tons per 8 hour day . . . Hydraulic boom control is instantly responsive and is automatically held at any desired position. Boom can be lowered without disconnecting drive chains. Rotary Screen attachment available.

STEEL TOOTHED SPIRALS "pick before they shovel" to loosen material for faster loading . . . Mounted on 6 rubber tires, the P-11 is highly mobile and easily operated by one man . . . You can depend on a NELSON for high-speed loading at the lowest possible cost!

Write for catalog No. 531 showing a wide variety of working photographs, mechanical details and complete specifications.

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N. P. NELSON IRON WORKS, INC.
CLIFTON • NEW JERSEY
MANUFACTURERS OF LOADERS SINCE 1917

KEEP ABREAST WITH INDUSTRY TRENDS THROUGH ROCK PRODUCTS

Slurries... *handled at lower cost*

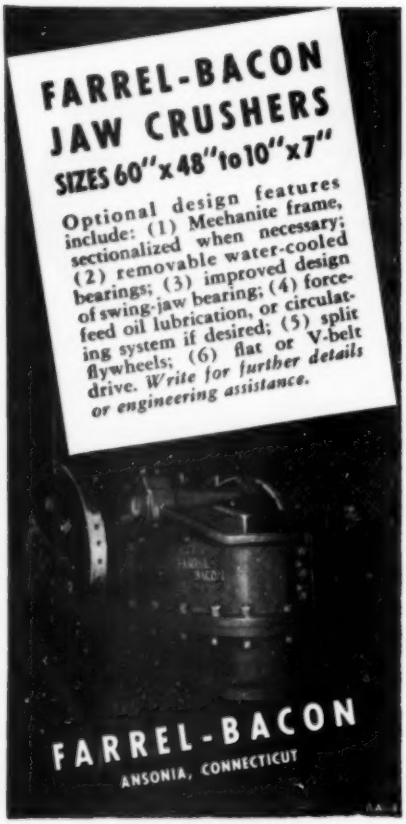
The new WILFLEY MODEL K Centrifugal Sand Pump embodies important mechanical improvements especially adapted to the handling of cement slurry and results in stepped-up production and substantial power savings. Individual engineering. Write for details.



Buy WILFLEY for Cost-Saving Performance

A. R. WILFLEY & SONS, Inc.
Denver, Colo., U.S.A.
New York Office: 1775 Broadway, N.Y.C.

WILFLEY centrifugal PUMPS



Murray from Oakland with his assistant, W. B. Walker, and Robert A. Pelusi, division sales representative.

Caterpillar Tractor Co., Peoria, Ill., has announced plans for construction of a new manufacturing plant in Decatur, Ill., for the production of motor graders and industrial wheel tractors. Warren Kinsey has been appointed manager of the new plant; A. W. Johnson, manager of manufacturing; Ridley Orton, purchasing agent; H. O. Nelson, manager of employe relations; and C. A. Vobroucek, chief accountant.

New York Belting & Packing Co., Passaic, N. J., has announced the following changes in its district sales organization: William I. Butler, district manager for the east central states, with offices in Cleveland; William W. Conrad, manager for the southeastern district, with headquarters in Atlanta; and Malcolm B. Roach, assistant manager for the southwestern district with offices in Dallas.

Cleaver-Brooks Co., Milwaukee, Wis., announces the appointment of the D. E. McCulley Co., Omaha, Neb., as sales representative in western Iowa and central and eastern Nebraska.

Hammond Bag & Paper Co., Wellsburg, W. Va., has announced the appointment of D. E. Tobey as sales representative in western Missouri, Kansas, Nebraska and Colorado, with headquarters in Kansas City. He succeeds G. R. Wiggins, who has been transferred to the St. Louis territory.

Koehring Co., Milwaukee. Wis., has announced the appointment of the Tri-State Equipment Co., El Paso, Texas, as distributor in the Texas counties of El Paso, Hudspeth, Culberson, Reeves, Jeff Davis, Presidio, Brewster, Pecos and Terrell, and the New Mexico counties of Dona Ana and Otero.

Hardinge Co., Inc., York, Penn., has announced the election of John J. Cadot as executive vice-president and Robert J. Russell as vice-president in charge of sales, in addition to their duties as treasurer and works manager, and corporation secretary and sales manager, respectively.

Gilman Paper Co., New York, N.Y., announces the appointment of Fletcher L. Munger as western sales manager in charge of the Chicago office to succeed E. A. Kendler, who has retired after 40 years of service with the company. Mr. Munger was previously with St. Regis Paper Co. and Bemis Bro. Bag Co.

Highway Equipment Co., Inc., Cedar Rapids, Iowa, announces the appointment of John Miller as southeastern district manager covering Arkansas, Louisiana, Tennessee, North Carolina, South Carolina, Georgia, Florida, Alabama and Mississippi. He will make his headquarters in Atlanta, Ga.

The Euclid Road Machinery Co., Cleveland, Ohio, has announced the appointment of Melbourne W. Miller as district manager for Montana, Alberta, Canada, North Dakota and South Dakota exclusive of Fall River, Shannon, Custer, Pennington, Lawrence, Meade, Butte, Harding and Perkins counties.

United States Rubber Co., New York, N.Y., announces that Warren A. Tipton has been appointed general sales manager of the mechanical goods division, succeeding Walter F. Spoerl, who has retired after 45 years of service.

The Colorado Fuel & Iron Corp., New York, N.Y., has appointed E. J. Byrnes, Jr., as assistant general manager of sales, eastern division. He was formerly product sales manager of the springs and formed wire department, Worcester, Mass.

Baldwin-Lima-Hamilton Corp., Lima, Ohio, has announced the appointment of Jack Weston as sales representative for the construction equipment division in northern Illinois and the lower peninsula of Michigan.

Allis-Chalmers Mfg. Co., Milwaukee, Wis., announces that Lee S. Appleton and Edward K. Morton have been appointed sales representatives in the New Haven and Boston district offices, respectively.

Kugelfischer Georg Schafer & Co., Schweinfurt, Germany, announces that



Frazar & Co., Inc., New York, N.Y., has been appointed United States distributors of Fischer steel crushing and grinding balls.

St. Regis Paper Co., New York, N.Y., announces that Harry A. Hughes, Jr., eastern district sales manager of the multiwall bag division, New York, N.Y., and Howard C. Peterson, Jr., district manager of the southwestern sales district, Birmingham, Ala., have been elected vice-presidents of the St. Regis Sales Corp.

Borg-Warner Corp., Chicago, Ill., announces that A. P. Emmert, former president of the Warner gear division, has been appointed general manager of the Detroit gear division. He succeeds A. J. McAllister, who has retired.

Lippmann Engineering Works, Milwaukee, Wis., has appointed the following distributors: Vancouver Equipment Corp. Ltd., Vancouver, B. C., for British Columbia, Canada; and Casey-Metcalfe Machinery Co., Los Angeles, Calif., for the lower half of California.

Iowa Mfg. Co., Cedar Rapids, Iowa, has announced the appointment of Kenneth V. Turner as district representative for the states of New Mexico, Texas, Oklahoma, Arkansas and Louisiana, with headquarters in Dallas, Texas.

Gar Wood Industries, Inc., Wayne, Mich., has announced the appointment of Mark L. Shepard as manager of the Richmond, Calif., division. He succeeds J. B. Steed who has been given a new assignment.

Lippmann Engineering Works, Milwaukee, Wis., has appointed the P. A. Ross Machinery Co., Dallas, Texas, as distributor for north and east Texas, and Stockberger Machinery, Inc., Fort Wayne, Ind., as distributor in Indiana.

E. D. Bullard Co., San Francisco, Calif., announces that E. W. Bullard, president, has been appointed to the research committee of President Eisenhower's committee on occupational safety.

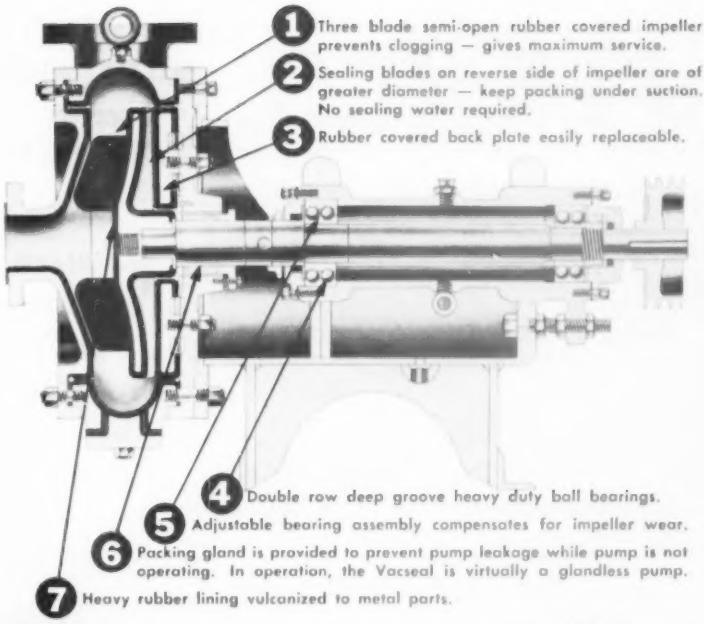
United States Rubber Co., New York, N.Y., announces that James C. Westfall has been named assistant to Ernest G. Brown, vice-president and general manager, mechanical goods division.

Chase Bag Co., Chicago, Ill., announces that J. R. Peat, special representative in the St. Louis sales department, has been promoted to sales manager of the St. Louis branch.

Worthington Corp., Harrison, N. J., has announced the retirement of Albert H. Borchardt, vice-president, after 44 years of service with the company.

Chicago Pneumatic Tool Co., New York, N.Y., has acquired the assets of The Jacobs Mfg. Co., West Hartford, Conn.

Pettibone Mulliken Corp., Chicago, Ill., announces that W. F. Sternberg, formerly production manager of the



7 features that equal 1 fact

VACSEAL PUMPS are built to serve better

Write today for BULLETIN PB-52. Get the facts in detail.

The Vacseal Pump, built to handle all types of abrasive pulps, is a boon to the rock products industry. Its patented design absolutely prevents solids from entering the gland. In fact, its unique construction makes it virtually a "glandless" pump. It requires NO SEALING WATER.

Vacseal solids handling pumps are in a size range of 2" to 8". Capacities 50 to 3000 gpm. Models to handle heads up to 150 feet and suction lifts to 12 feet.

Leaders in Experience & Service

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THE GALIGHER CO.

METALLURGICAL DIVISION

CONSULTATION • ORE TESTING
PLANT DESIGN • GEOLOGIC INVESTIGATION

ROCK
PRODUCTS
FEATURES
TIMELY
INDUSTRY
NEWS
EACH
ISSUE

HAYWARD BUCKETS

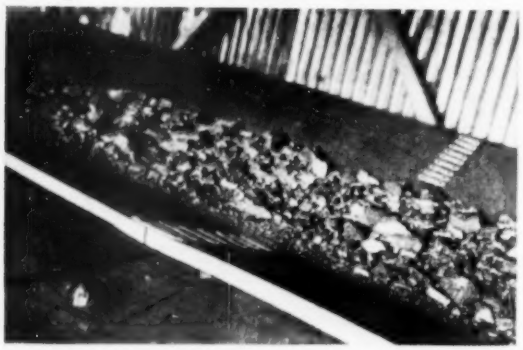
WON'T QUIT OR CAUSE TIME OUT

A Hayward Bucket keeps the job going ahead on scheduled time. It won't quit or cause time out.

THE HAYWARD COMPANY
202-204 Fulton Street
New York, N. Y.

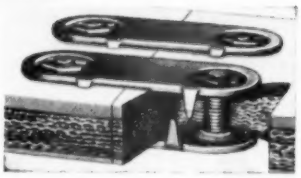
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BELT FASTENERS and RIP PLATES



FOR HEAVY CONVEYOR AND ELEVATOR BELTS OF ANY WIDTH

- ★ FLEXCO Fasteners make tight butt joints of great strength and durability.
- ★ Trough naturally, operate smoothly through take-up pulleys.
- ★ Distribute pull or tension uniformly.
- ★ Made of Steel, Monel, Stainless, Everdur. Also Promal top plates.
- ★ FLEXCO Rip Plates are for bridging soft spots and FLEXCO Fasteners for patching or joining clean straight rips.



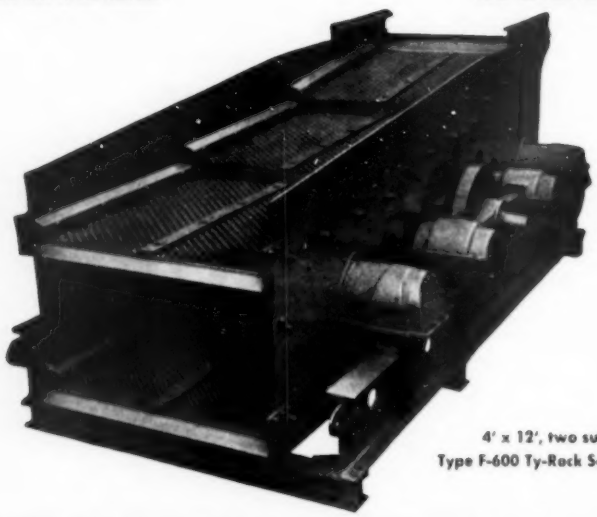
Compression Grip distributes strain over whole plate area

Order From Your Supply House. Ask for Bulletin F-100

FLEXIBLE STEEL LACING CO., 4684 Lexington St., Chicago 44, Ill.

YOU CAN DEPEND ON TY-ROCK SCREENS

BALANCED **RUGGED**



4' x 12', two surface
Type F-600 Ty-Rock Screen

THE W. S. TYLER COMPANY
CLEVELAND 14, OHIO
Manufacturers of Woven Wire Screens and Screening Machinery

Sterling division, The White Motor Co., Milwaukee, Wis., has been named manager, loader manufacturing, with headquarters in Chicago.

The Dorr Co., Stamford, Conn., announces that Dr. Elliott J. Roberts has been promoted to technical director in charge of research, development and the Westport mill. He was formerly director of research and will be succeeded in this position by Bryant Fitch, assistant director of research.

Flexible Steel Lacing Co., Chicago, Ill., has appointed Howard Gill as sales representative in Mississippi, Alabama, Georgia, Florida and western Tennessee. He succeeds Austin Webster, who has retired after many years of service.

General Electric Co., Schenectady, N.Y., has announced plans to construct a plant at Bloomington, Ill., to manufacture a complete line of electric controls for industrial use, including starters for motors, pushbuttons and compensators.

Western Machinery Co., San Francisco, Calif., has licensed the Sumitomo Machinery Co., Tokyo and Osaka, Japan, to manufacture and sell its entire line of ore-dressing and mining machinery products in Japan.

Chase Bag Co., Chicago, Ill., announces that Harrison B. Rue, who has been acting manager of the Buffalo branch, has been promoted to branch manager.

Farrel-Birmingham Co., Inc., Ansonia, Conn., announces the appointment of Gerald R. Gonyer as manager of the Chicago office to succeed Harry D. Temporal, who has retired.

Raybestos-Manhattan, Inc., Passaic, N. J., announces that J. H. Matthews has been appointed executive vice-president. He has been a director since 1942 and vice-president since 1947.

Sterling Electric Motors, Inc., Los Angeles, Calif., has opened a sales office in Chicago, Ill., with Earl J. Phillips as district manager.

Bucyrus-Erie Co., South Milwaukee, Wis., has appointed Graze-Dempsey, Inc., Jacksonville, Fla., as distributor for northern Florida.

The Heil Co., Milwaukee, Wis., has announced the appointment of H. J. Row as sales promotion manager of the body and hoist division.

Morse Chain Co., Detroit, Mich., has appointed the Abrasive & Supply Co., Detroit, Mich., as distributor for the Detroit industrial area.

R. G. LeTourneau, Inc., announces that its headquarters formerly located in Peoria, Ill., have been transferred to Longview, Texas.

Sprague & Henwood, Inc., Scranton, Penn., has opened a branch office at Grand Junction, Colo., under the management of Robert R. Carver.

Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, Ohio, has

Tuffy®

Easy To Handle But Hard To Wear Out!



"Tuffy Gives Almost Twice The Service That (Another Dragline) Gives"

Says A Texas Construction Company Operator

(Name on Request)

Tuffy Draglines are made of wires of the finest steel, woven in a special dragline design that lets Tuffy take sharper bends, angle pulls and rapid line speeds. In many cases, the built-in extra toughness has helped cut dragline costs . . helped move more material for longer periods of time. You'll find Tuffy Draglines give you the extra flexibility you want, the extra abrasive resistance you need! See for yourself what Tuffy can do for you. All you need to order is length, diameter and "Tuffy!"

Send For FREE Folder



UNION WIRE ROPE CORP.

Specialists in Wire Rope and Braided Wire Fabric

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Please send me the FREE illustrated folder on Tuffy Dragline.

*Firm Name*_____

By _____ *Title* _____

*Address*_____

*City*_____ *Zone* ___ *State* ____

C-18

appointed J. A. MacIntire, Jr., as assistant manager of wire braid hose sales.

LeTourneau-Westinghouse Co., Peoria, Ill., has appointed the Atlantic Tug & Equipment Co., Syracuse, N.Y., as distributor in northeastern New York state.

Sterling Electric Motors, Inc., Los Angeles, Calif., has opened a new sales office in Rochester, N.Y., with John C. Ringland as manager.

Dewey & Almy Chemical Co., Cambridge, Mass., has announced the election of Waldo W. Neikirk as treasurer in addition to his duties as controller.

The Bristol Co., Waterbury, Conn., has appointed F. W. Borchers as general sales manager. He was formerly assistant sales manager.

St. Regis Paper Co., New York, N.Y., has opened a new multiwall bag sales office in Dallas, Texas.

Land Recovery Program

IDEAL CEMENT CO., Denver, Colo., has undertaken a $100,000 program to restore farm and range lands near its Boettcher plant near Laporte, Colo. About 700 acres of irrigated farm and pasture land, and 50 acres of dry land pasture are now being used and the company expects to rehabilitate an additional 3600 acres. Extensive re-seeding is planned for the area and fall wheat will be planted on 100 acres. Since acquiring the farms near the plant, the company has leased them to tenants. Weed control has been started with chemical spraying and a heavy fertilization program is underway. Surveys to improve the program are also underway.

Fire Destroys Stone Plant

BALDUCCI CRUSHED STONE CO.'S crushed stone plant at Gouverneur, N.Y., was recently destroyed by fire, with damages estimated at $100,000. Besides the 35- x 200-ft. plant building, the loss included about 400 tons of crushed limestone, various pieces of rock-crushing machinery, 30 electric motors including some in the 60-hp. range, stacks of empty limestone bags and various hand tools and small pieces of equipment. The plant was owned and operated by John M. Balducci.

Buys Asphalt Plant

CADMAN GRAVEL CO., Redmond, Wash., has purchased an asphalt plant from Columbia Equipment Co., of Seattle, Wash. The company plans to supply the asphalt needs of the Redmond area, in addition to producing sand and gravel, ready-mixed concrete and building supplies.

Opens Gravel Plant

NORTH STAR SAND AND GRAVEL CO., newly organized, has opened a sand and gravel and ready-mixed concrete plant at Edmonds, Wash. Rhoady Lee is plant manager.

Tuffy®

Helps Operators Make Better Time & Yardage



"My Operators Like Tuffy SCRAPER ROPE Better Than Any"

Says Owner of a Nebraska Construction Company

Wheel scrapers need wire rope that stands up under strains and stresses that hoist or other standard ropes can't take . . . and Tuffy Scraper Ropes do the job! Each strand is pre-shaped, which relieves it of internal stresses. This leaves the full strength of every strand free to carry its share of the load! Tuffy is flexible enough for easy handling, easy winding . . . and so designed to resist drum crushing caused by rope crossovers. Just ask for:

Tuffy Scraper Rope

_____ Reels _____ Feet

How Many Length

_____ inch in diameter.

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Please send me my FREE illustrated folder on Tuffy Scraper Rope.

*Firm Name*_____

By _____ *Title* _____

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*City*_____ *Zone* ___ *State* ____

C-17

Special Type Crusher Plates Built to Your Order with MANGA-TONE N.M.

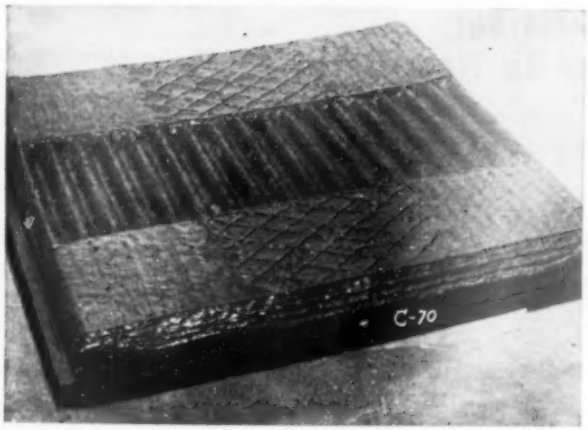
Every operator of crushing equipment has wanted many times to alter the crushing surfaces of the jaw crusher to more efficiently handle the material being crushed.

Heretofore the only way this could be done was to have the special casting made and usually the pattern costs were prohibitive.

Now your Two-Tone Shop is fully capable of rebuilding any worn standard crusher plate to your own style or design and at costs that will not be out of reason.

The 24x36 crusher plate illustrated originally had standard corrugations running full length. A Two-Tone Shop rebuilt the worn plate to this design and the operator reported the following results:

Normally two stationary jaws were worn out to one movable plate. But the specially built stationary plate pictured lasted exactly as long as the movable plate, which meant a 50% saving in the cost of stationary plates.



You too can profit by similar savings if you have need for a special plate. Your Two-Tone Shop uses only the best--MANGA-TONE N. M. Call our Field Man and talk this over.

RESISTO-LOY COMPANY - Grand Rapids 7, Michigan

Here's the PRACTICAL, PROFITABLE Answer to your Aggregate Handling Problems

Lessmann HEAVY DUTY LOADER

The rugged, dependable, low-cost Lessman Loader takes a ton bite, has 11' bucket clearance and will dump at the very front of the highest truck when approached from the tail gate! Lessmann is completely hydraulic, has unrestricted visibility and many safety features which also make for fatigue-free operation. Available in ⅝ to 1¼ yard bucket capacity.

A single lever controls bucket forward thrust of 7½ tons *while unit is standing still!* Handles frozen aggregate with ease! Forks and crane hook available for handling cast concrete products.

The Lessmann Loader is a complete unit, built by the 34-year old Lessmann Manufacturing Company. Components such as driving axle, engine, hydraulic system are Timken, Ford, Vickers, Bendix, etc. . . . *parts with a pedigree* . . . Standardized Parts to minimize down time and maintenance cost.

Inclosed cab, Vickers power steering, and Bendix Hydro-Vac brakes are available as optional equipment. *Get all the facts and you'll get a Lessmann.*



Loading "Black-Top" at a mixing plant.



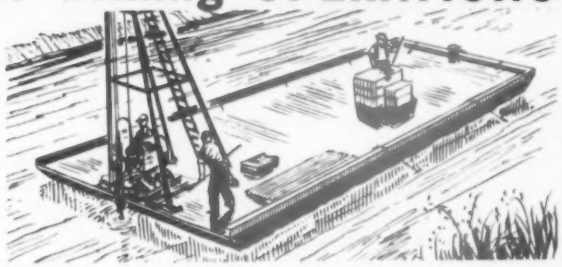
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CONTRACT Diamond Core Drilling OPERATIONS

ANY KIND – ANY TIME – ANYWHERE



For more than sixty years Sprague & Henwood, Inc. has been a leader in the field of Contract Diamond Drilling. During this long period our crews have completed thousands of contracts successfully in every corner of the globe — under every conceivable condition.

From shallow holes to depths of more than a mile — in regions so remote that men and equipment were delivered by float planes — from barges on lakes and rivers — in mountain terrain so wild that mule-back transportation was required — from the blazing tropics to the sub-zero arctic — our crews have overcome every difficulty and completed their assignments to the customer's satisfaction.



Today, we have a large force of experienced operators and supervisors and an ample supply of modern equipment for every drilling requirement, so that we can undertake almost any job — anywhere — on very short notice.

Besides exploratory drilling for coal and ore, from the surface or underground, our contract service includes blast-hole drilling, directional drilling, foundation test drilling, grout holes and pressure grouting. Estimates, and constructive suggestions whenever possible, submitted promptly on request.

Manufacturers, also of high-speed diamond drilling machines, diamond bits and complete accessory equipmen. Write for catalog.

SPRAGUE & HENWOOD, INC.
SCRANTON 2, PA.

Branch Offices: NEW YORK · PHILADELPHIA · PITTSBURGH · GRAND JUNCTION, COL. · BUCHANS, NEWFOUNDLAND

These buckets pay off in longer life, better handling



Equip your elevators with rugged, dependable LINK-BELT Cast Buckets

YES, the complete line of Link-Belt Cast Buckets pays dividends in proper filling, clean discharge. Improved casting methods assure uniformity.

And they're made of highest grade malleable iron or Promal (the stronger, longer wearing metal). That's why they resist abrasion and corrosion . . . stand up under hard usage. Smooth, seamless surface minimizes friction and wear.

Choose Link-Belt Cast Buckets from the line that includes all sizes in many different styles. Link-Belt also builds steel buckets of various designs. Call the Link-Belt sales office or distributor nearest you for local stocks and complete information.

LINK-BELT
CAST ELEVATOR BUCKETS

LINK-BELT COMPANY: Plants: Chicago, Indianapolis, Philadelphia, Colmar, Pa., Atlanta, Houston, Minneapolis, San Francisco, Los Angeles, Seattle; Scarboro, Toronto and Elmira, Ont. (Canada); Springs (South Africa); Sydney (Australia). Sales Offices, Factory Branch Stores and Distributors in Principal Cities. 13.217

MINNEAPOLIS MOLINE
MM
MODERN MACHINERY

INDUSTRIAL WHEELERS Cut HANDLING COSTS



Roll back loading costs with the new UTIL Shuttle Wheeler! A new shuttle gear gives 6 reverse speeds at 85% of the 6 forward speeds (1.8 to 14.5 m. p. h.). Since loader operation is 50% forward and 50% reverse travel, UTIL *fast reverse speeds* and *quick change* from forward to reverse gear cut time on every load!

MM Roller Spin Steering permits steering wheel to roll easy with capacity loads. Heavy-duty front-end 10,000 lb. tire capacity and engineered design *minimizes road shock* and operator fatigue.

See Your MM Dealer-Distributor or Write

MM INDUSTRIAL POWER UNITS for hoists, electric generators, rock crushers, pumps, compressors, cranes, shovels, and many other industrial uses give excellent performance and economy . . *proved* adaptability!

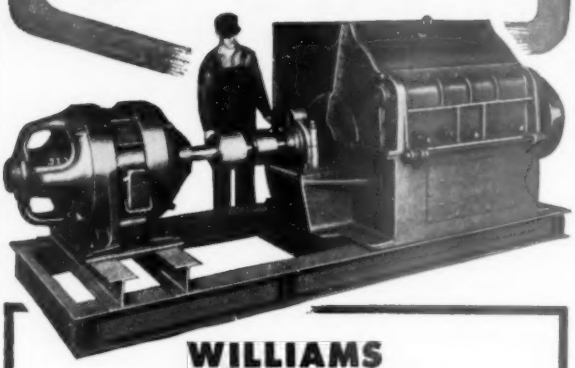


- *High-turbulence combustion chamber!*
- *Controlled cooling!*
- *Exclusive MM Heat Exchanger Base Pan!*
- *Oil pressure and water temperature safety cutouts!*
- *Removable cylinder heads and blocks!*

From 25 to 230 h.p.

MINNEAPOLIS-MOLINE
POWER IMPLEMENT COMPANY
MINNEAPOLIS 1, MINNESOTA

Only One Operation To Crush 6" Stone To Agstone Or Smaller!



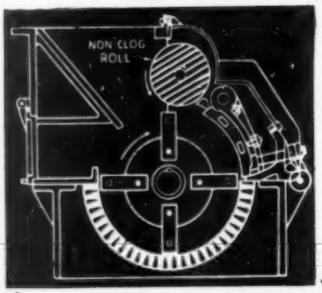
WILLIAMS SECONDARY HAMMER MILLS

For speed and stepped-up output in reducing rock of 6" size to agstone — or down to 20 mesh if required — Williams secondary hammer mills are in a class by themselves! Capacities range up to 75 tons per hour. Hundreds of installations have proved them outstanding profit-makers!

Extremely heavy rib-reinforced construction — manganese steel liners and breaker plates — easy adjustment to compensate for wear — double duty hammers — metal trap for tramp iron — instant access for service — these and many other features make the low cost Williams Hammer Mills top paying investments!

Many Sizes For Any Requirement

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NON-CLOG ROLL MECHANISM

The best way to handle wet, sticky clay or shale direct from pit for quick grinding without clogging. Roll is attached to hopper opening. Can be driven off main pulverizer shaft if desired.

OTHER WILLIAMS EQUIPMENT

ROLLER AND IMPACT MILLS with Air Separation for grinding to 325 mesh or finer . . . HELIX-SEAL MILLS for dustless or wet grinding . . . DRYER MILLS . . . AIR SEPARATORS . . . VIBRATING SCREENS . . . COMPLETE "PACKAGED" PLANTS ready to install.

WILLIAMS PATENT CRUSHER & PULVERIZER CO.
800 ST. LOUIS AVE. ST. LOUIS 6, MO.

WILLIAMS
CRUSHERS GRINDERS SHREDDERS
OLDEST AND LARGEST MANUFACTURER OF HAMMER MILLS IN THE WORLD



NOW- *Authenticated Drilling Test Results tell the TRAVEL DRILL story!*

Secondary Drilling Costs Cut to Unbelievable New Low!

Drilling tests comparing Travel Drill performance with experienced jackhammer operators have been carried on in several quarries for well over a year. Test records, kept and authenticated by Travel Drill users, show cost reductions almost beyond belief unless you have seen a Travel Drill in action. Accidents, too, were virtually eliminated. Self-contained and traveling under its own power, a Travel Drill, operated by one man, does the work of 6 to 8 jackhammer operators. Get the Travel Drill facts NOW—

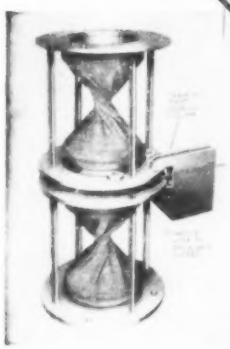
WRITE for authenticated Records and Description.

The TRAVEL DRILL Co., Inc. P. O. Box 1124 Raleigh, N. C.

S-A for handling **ROCK PRODUCTS** at **ROCK-BOTTOM COST**



for EXAMPLE....

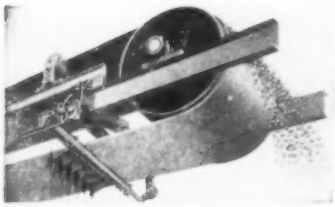


"TWISTITE" BIN VALVES

For dust-tight, dribble-proof bin flow control of both lump and fine materials. Rubber sleeves twist for a tight seal, by means of either hand or motor control, local or remote. When gate is open the two rubber sections, joined by a rotating collar, allow free flow. Write for Bulletin 254-A.

S-A BELT CONVEYORS

Engineered and built to withstand heavy duty service in moving large volumes of materials at low cost per ton. Available in a wide variety of sizes and arrangements—to meet specific operating conditions. Ask an S-A engineer for full details, or write for Catalog 146.



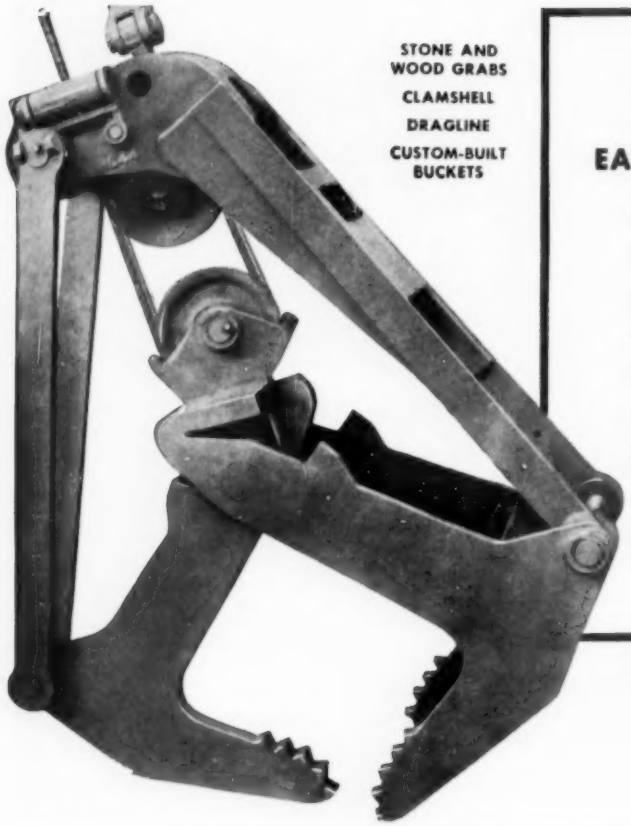
CONVEYOR BELT CLEANER

Pays for itself by prolonging belt life. Removes wet or dry material, leaving surface of belt clean and dry. Installs easily on any belt conveyor. No moving parts—no power is required. Write for Bulletin 651.

STEPHEN S-A ADAMSON MFG. CO.

7 Ridgeway Avenue, Aurora, Illinois • Los Angeles, Calif., Belleville, Ontario

DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT



STONE AND WOOD GRABS
CLAMSHELL
DRAGLINE
CUSTOM-BUILT BUCKETS

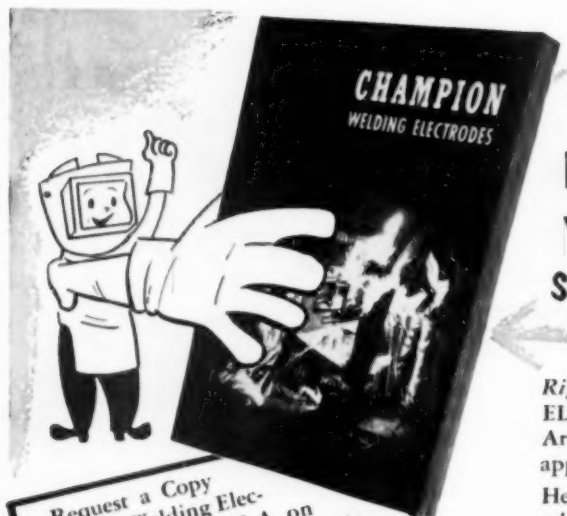
WELLMAN

EASY HANDLING OF LARGE STONES

● Those big stones won't slip from the Wellman Stone Grab. Four-part closing cable reeving develops tremendous closing force on stones. Model shown has 5-ton capacity, 4½ foot jaw spread. Other capacities available.

Want Facts? *Send for free descriptive bulletins.*

THE WELLMAN ENGINEERING COMPANY
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Request a Copy of Our Welding Electrode Catalog 53-A on your letterhead. This valuable information will go forward to you immediately.

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The National Metal Exposition
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HERE IT IS! Latest Information to Help Solve Your WELDING PROBLEMS

Send For Your Copy NOW

Right off the press! Our new CHAMPION WELDING ELECTRODE Catalog describes the full line of CHAMPION Arc Welding Electrodes and Gas Welding Rods for all applications.

Here are 40 pages of vital information, answering questions which have been bothering you for a long time.

For CHAMPION performance you need a Champion electrode . . . why use ordinary electrodes when *CHAMPIONS* cost no more?

THE CHAMPION RIVET CO.
CLEVELAND 5, OHIO • East Chicago, Ind.

CONCRETE PRODUCTS

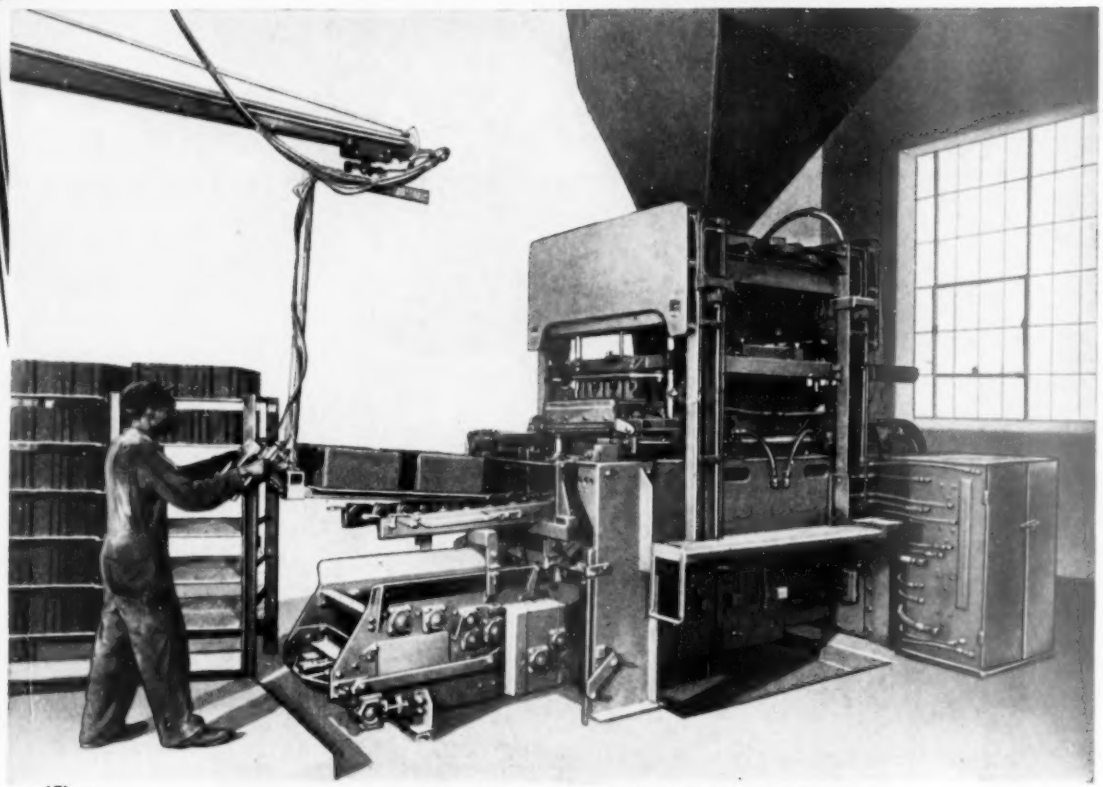
A SECTION OF ROCK PRODUCTS

CONCRETE UNITS · READY-MIXED CONCRETE



Aquatite Tile Co., Bradenton, Fla., produces many different concrete products

The "King" RULES



because it's RIGHT!

Yes, the GOCORP "King" is tops in each area in which it operates. That's because the blocks it makes are so superior, and are produced at a cost less than ordinary blocks. Here's a machine that represents the best and latest thinking of men with a lifetime of experience in this field. Block plant owners who have investigated, like the owner of this typical "King" operation, recognize these advantages GOCORP offers:

- Hydraulic "sequence operation"— for high quality blocks, low maintenance.
- Vibrating mold filled directly from main supply hopper—no feed drawer.
- Intense vertical vibration, combined with pallet-to-mold clamping, assures compact, uniform units.
- "Tomorrow's machine today" — removes obsolescence risk.

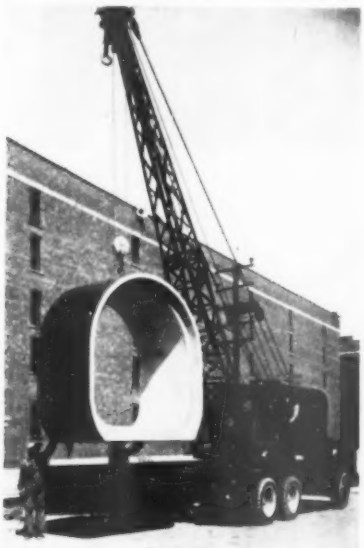
These are only a few reasons why the GOCORP "King" rules. If you want three or four cycles per minute—six blocks per cycle—with one operator—simultaneous production of two sizes, if desired—write for further details on the "King" and name of our representative near you.

GO CORP
ADRIAN-MICH.
407 Grace Street Adrian, Michigan

INDUSTRY NEWS

Flat Base Concrete Pipe

UNIVERSAL CONCRETE PIPE CO., Columbus, Ohio, recently supplied precast, flat-base, concrete pipe sections for the construction of a water-proof



Section of precast, tongue-and-groove, flat-base, concrete pipe used for industrial tunnel

tunnel to house underground roller conveyor lines and to serve as a pedestrian pass between two plant buildings, for National Distillers Products Corp.'s Cincinnati, Ohio plant.

Universal Concrete Pipe Co. worked with L. A. Petrov, chief engineer of National Distillers, in designing this project. The sections of 97- x 97-in. tongue-and-groove pipe were custom-built at Universal's Columbus plant and shipped to Cincinnati. Use of these precast units reportedly effected considerable savings in time and money over monolithic construction.

Cover Picture

THIS MONTH'S COVER PICTURE is an aerial view of the Aquatite Tile Co. plant at Bradenton, Fla. The company has enjoyed a phenominal growth in the production of block and cast concrete units as well as ready-mixed concrete. In addition to standard and slump block, it also makes a number of specialties. Complete details about this company's interesting operations are contained in an article appearing in this issue.

Named Western Sales Representative

G. F. STEIGERWALT, formerly associated with the Portland Cement Association and with the concrete products industries, has been appointed sales and service representative in the states of California, Oregon and Washington, with headquarters in San Rafael, Calif., for The Gene Olson Corp., manufacturer of concrete block machines, batch mixers, skip loaders and related equipment.

Mr. Steigerwalt, a graduate of Iowa State College, in agricultural and highway engineering, was associated with the highway and municipal department of Iowa and Idaho from 1917 to 1922. Following this he became affiliated with the P.C.A. and held the office of general field man for Montana. His first venture in the manufacture of concrete products was at a concrete products plant at Mis-



G. F. Steigerwalt

soula, Mont. From 1926 to 1936 he was again affiliated with the P.C.A. in its office of Concrete Contractors Schools and Sales Promotion. From 1939 to 1940, he was with the P.C.A. San Francisco, Calif., office where he devoted his time to concrete products and concrete construction. In 1940 he organized the Haydite Concrete Products Co. at San Rafael, Calif., which he owned and operated until early in 1952.

Concrete Products Plant

MARSHALL CONCRETE PRODUCTS CO., Marshalltown, Ia., has begun operations at its new $200,000 concrete products plant. The company has expanded to supply the central Iowa area, increasing its production five times its previous rate and doubling employment. The plant has modern equipment and plans have been made to include in its production, a complete line of concrete products including brick and tile, burial vaults and septic tanks.

■

FLEXICORE OF TEXAS recently started production of reinforced concrete roof decks at a new plant in Deer Park, Texas.

J. P. LOOMIS COAL AND SUPPLY CO., Akron, Ohio, has added three trucks to its company fleet for delivering Supermix central-mixed concrete. Each of the trucks has a capacity of 6 cu. yd. of central-mixed concrete. The company now operates a total of 26 trucks for the delivery of concrete and a fleet of 60 trucks for the delivery of other building materials.

IRVING BROTHERS GRAVEL CO., Harlan, Ind., recently began operations at its newly erected ready-mixed concrete plant at the Consolidated Cement Corp. quarry, Paulding, Ohio. Plant equipment includes a 4-cu. yd. weigh-batcher, seven transit-mixer trucks and a two-way radio system with sending headquarters in Harlan.

WATERTOWN CEMENT PRODUCTS CO., Watertown, S. D., has expanded its plant operations by the addition of a Stearns "50" block machine. The addition of the new block machine is expected to triple the plant's production, to approximately 75,000 to 1,000,000 block per year.

VALLEY BLOCK CO. has been established at Rexburg, Idaho, by Ross Dunn of Egin, Idaho, and Frank Tanner, Parker, Idaho. Plant production is from 2000 to 3000 pumice block per day.

UNION ROCK AND MATERIAL CO. recently installed a new concrete batching plant at its ready-mixed concrete plant in Phoenix, Ariz. A fleet of 21 transit-mixer trucks handles the plant's production.

AMOS ANDERSON has purchased the interest of Vincent Wagner in Ready Mix Concrete Co. at Detroit Lakes, Minn., and is now in partnership with Ray Hendrickson, who has been with the company since its organization.

THE CARR BROTHERS ready-mixed concrete plant in Walton Hills, Ohio, recently began operations. The plant is one of the most recent additions in the company's expansion program. Floyd L. Carr is president of the firm.

READY MIX CONCRETE CO., Dunn, N. C., is producing 300 cu. yd. of ready-mixed concrete daily at a $75,000 plant which is the city's first. Alfred Surles is manager and O. W. Godwin, Jr., plant operator.

CENTRAL MIX CONCRETE CO., Dupree, S. D., has awarded a scholarship to a Dupree student for the 1953-1954 school year at the School of Mines in Rapid City, S. D.

KEN MCREYNOLDS, Siloam Springs, Ark., has begun operations at a new ready-mixed concrete plant. Plant equipment includes two transit-mixer trucks.

READY-MIX, INC., recently formed, began operations at its ready-mixed concrete plant in Two Harbors, Minn.

KENNETH J. WALKER began operations at a new ready-mixed concrete plant in DeWitt, Ia.

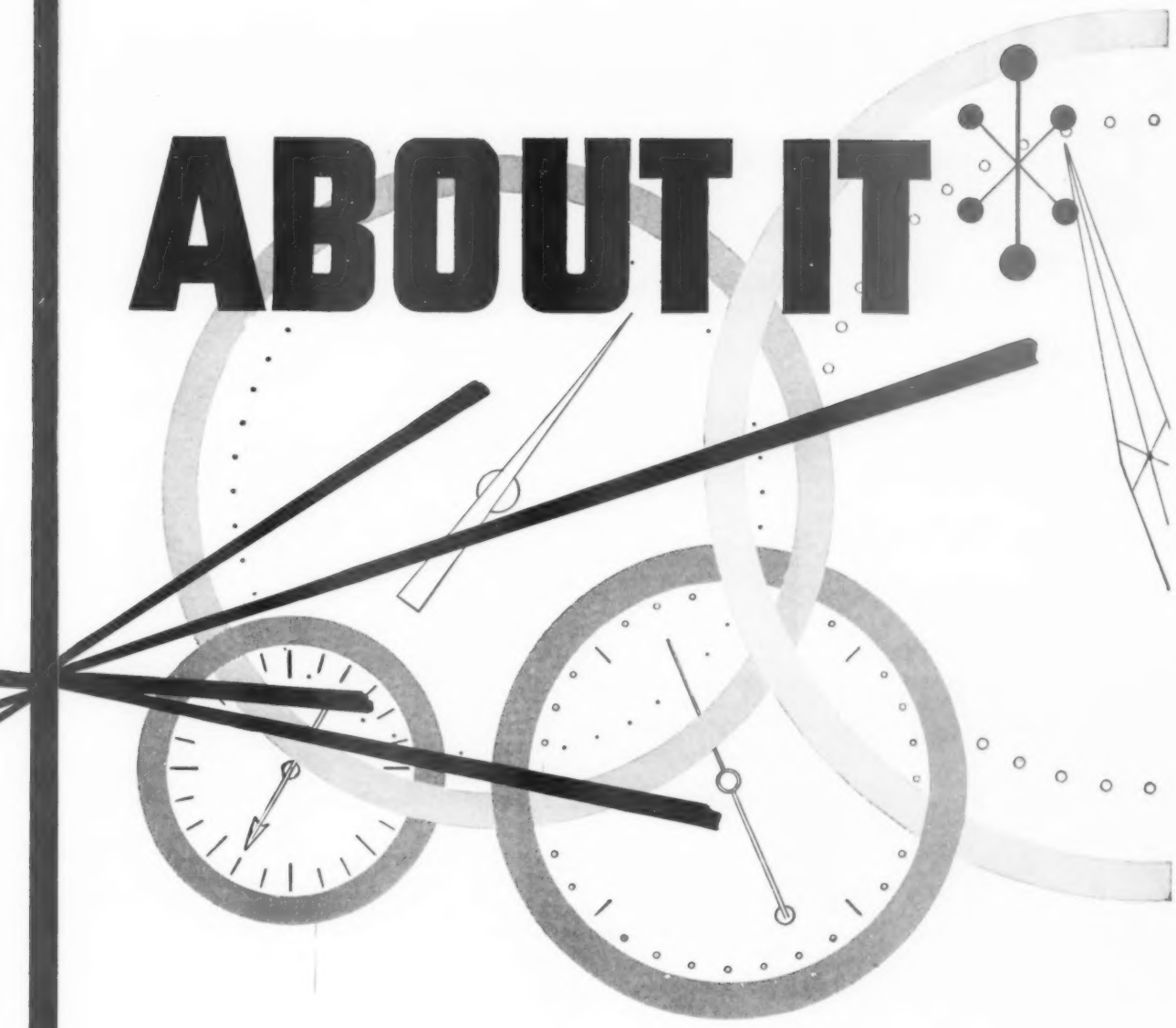
NO DOUBT



CHAIN BELT
REX
COMPANY ®

adjusta-wate moto-mixers

ABOUT IT



LOWEST WEIGHT

Yes, every possible ounce of *unneeded* weight has been taken out of Rex Adjusta-Wate Moto-Mixers. You can be *sure* because only Chain Belt Company uses *electronic strain gauges* to test every part of a Rex Moto-Mixer. Every part is just the right weight for the job it has to do . . . *not* too heavy, *not* too light! You're sure that Rex is the lowest weight that it can possibly be and still assure lowest operating and maintenance costs.

BIGGEST LEGAL PAYLOADS

You can be equally *sure* that the Rex Adjusta-Wate design takes full advantage of the weight laws in any state. You have true flexibility in mounting . . . can mount a Rex on the truck of your choice for biggest legal payloads and still have . . . *shortest wheelbase . . . ample rear wheel clearance for proper discharging . . . best possible over-all weight distribution on the truck.* PROOF . . . just ask the operator who has Rex Adjusta-Wate!

Ask your Rex Distributor to give you the complete facts on the Electronic Strain Gauge Tests and the Rex Adjusta-Wate Design. Chain Belt Company, 4649 W. Greenfield Ave., Milwaukee 1, Wis.

84 FLOORS concreted with 'INCOR' in 69 WORKING DAYS

Tight Schedules and Dependable 'Incor' Performance Save Time, Cut Costs to the Bone





ST. NICHOLAS HOUSES—SECTION 3
Owner: NEW YORK CITY HOUSING AUTHORITY

General Contractors:
C. E. YOUNGDAHL & COMPANY, INC., Long Island City
JAMES McHUGH CONSTRUCTION CO., Chicago, Ill.

Architects: YORK & SAWYER, New York

Structural Engineers:
SEVERUD, ELSTAD & KRUEGER, New York

Ready-Mix 'Incor' Concrete:
JAMES A. NORTON, INC., New York

● Emphasizing utmost value for the public's building dollar, the New York City Housing Authority has encouraged many advances in building techniques, outstanding among which is widespread use of reinforced-concrete-frame construction.

Recent example is Section III, St. Nicholas Houses—six 14-story-and-roof units . . . first pour, March 22, 1953, topped out June 30 . . . 84 floors concreted by C. E. YOUNGDAHL & COMPANY, INC., in 69 working days.

Maximum job speed and economy, due to tight schedules, based on dependable 'Incor'* 24-hour stripping strengths . . . engineered forms, built to closest tolerances for streamlined erection efficiency . . . expert utilization of skilled work force.

Further proof that sound planning and open-minded co-operation among Designer, Builder and Owner make it possible to obtain the fire-safety and structural soundness of concrete, at costs and erection speed which equal or beat any other type of construction.

*Reg. U. S. Pat. Off.



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LONE STAR CEMENT, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS: 18 MODERN MILLS, 129,000,000 SACKS ANNUAL CAPACITY



Ready-mixed concrete truck and flatbed truck for hauling concrete block, joists, lintels, and floor tile

DIVERSIFIED PRODUCTS

Spell Success for Florida Plant

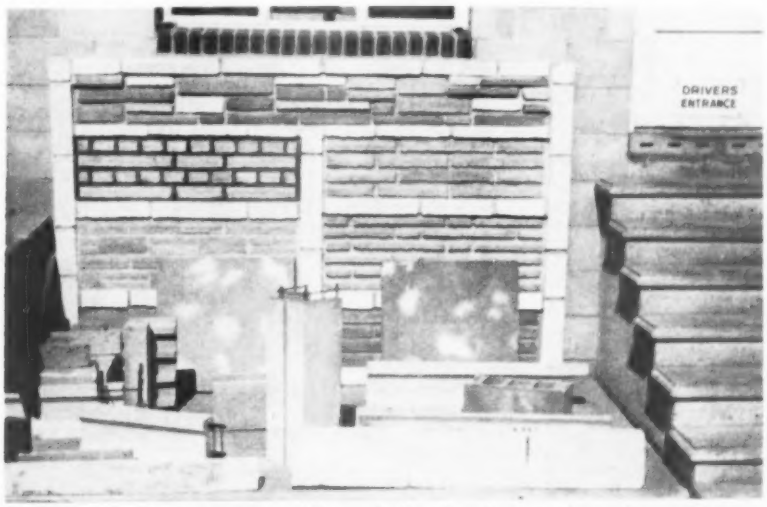
By LOWELL ROBERTS

Aquatite Tile Co., Bradenton, Fla., produces ready-mixed concrete, concrete block and brick in all standard sizes, slump brick and block, split block in colors, precast steps, joists, lintels, sills, floor sections, sea wall slabs and cribbing

CLARENCE NEEDHAM, president and general manager of the Aquatite Tile Co. started in business in the small town of Bradenton, Fla., in 1926 with a small block machine and a second hand truck which he used to deliver his block and ready-mixed concrete which was mixed in a small mixer mounted on a platform in his small yard. His desire to furnish quality concrete products and ready mixed concrete plus hard work, and a very pleasant and unusual personality have built the business to the point where the annual volume exceeds a million dollars. The population of Bradenton is less than 20,000 and Mr. Needham feels that his large volume in a city of this size is due to his policy of fair and honest treatment of his customers and employes alike.

The company suffered a very hard blow in 1945 when an uninsured fire practically destroyed the plant and warehouses. The plant was rebuilt immediately along modern lines, using up-to-date equipment, and continued to produce and market a complete line of quality materials.

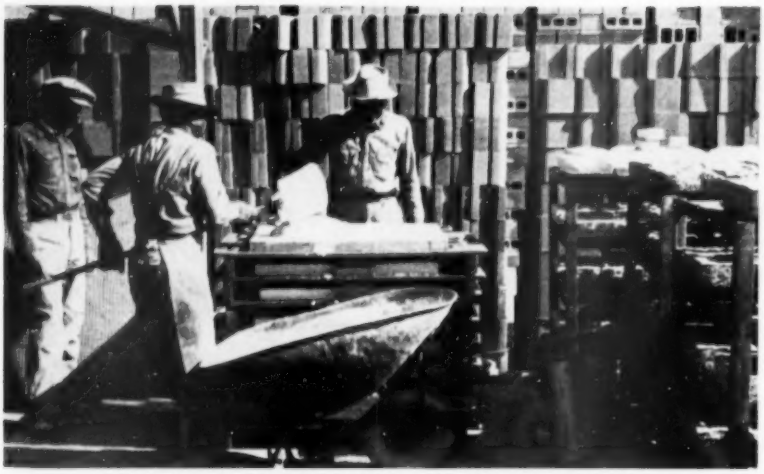
The area served covers a large vegetable and cattle-raising section within a radius of about 30 miles from Bradenton which includes a few small villages. Considered one of the most versatile concrete products plants in the South, it is also the largest plant on the west coast of Florida south of Tampa.



Showing part of an elaborate display of products manufactured

Make Specialties

The plant, storage yards, shops, warehouses and office cover nearly four acres, along the Seaboard railroad near the downtown section of Bradenton. Aquatite produces and markets ready-mixed concrete, concrete block and brick in all standard sizes and shapes, slump brick and block and split block in colors, Homeward precast steps, concrete benches and bench ends, joists, lintels, sills, house pillars and bases, driveway markers, patio slabs, walks, precast floor sections, septic tanks, sea wall slabs and cribbing, dock pillars, bridge counterweights, buoy anchors and other marine products to order, mar-



Making slump brick. Workman is filling grids with white cement mortar

belized floor and wall tile and window sills. They also handle a complete line of building materials. Any kind or type of precast materials are made to order as required. Sales are made to contractors, owners and industries on the retail level.

Stone and sand, received by rail on the 14-car siding, are unloaded by means of truck cranes with clamshell buckets which dump into a hopper supplying the bucket elevator or into stockpiles as may be required. Bin storage of 600 tons of aggregate is maintained with a good ground storage area nearby. Cement from the hopper cars is unloaded into a 1000-bbl. bin by means of a bucket conveyor. Weigh batchers supply all material to the transit mix trucks. Vinsol resin is used in all concrete and concrete products to provide uniform workability, durability and more waterproof materials. High early strength cement is used in all products where sea water comes in contact with the concrete.

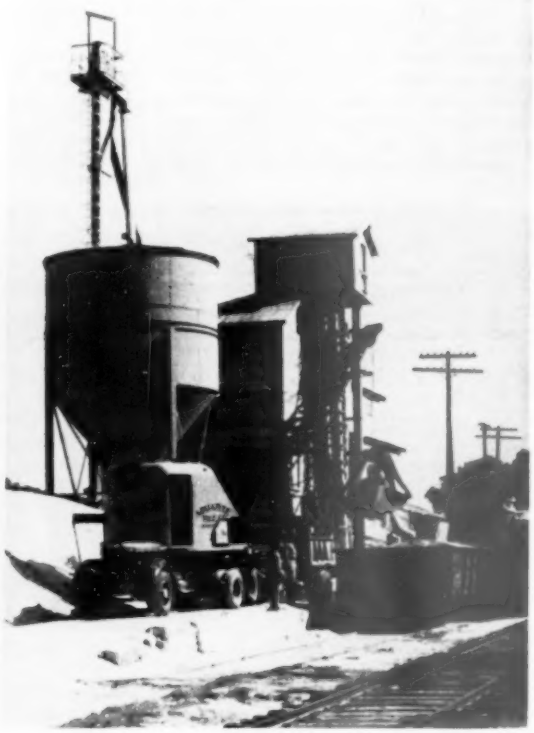
Block Plant

The block plant, which adjoins the concrete plant, has two Stearns No. 50 machines fed by a Kent volume mixer. The capacity of the plant is about 7500 standard 8-in. units per 8 hr. shift. Overhead bins containing ⅜-in. stone and sand, supply the mixer. Cement is obtained from the bulk bin by a variable speed screw conveyor which is set to deliver 9/10 lb. of cement per revolution. A revolution counter is attached. Uniform supply of cement to the screw is assured by the use of a Syntron vibrator attached to the bin directly over the screw outlet. Supply of water and blended aggregates is calibrated to meet the cement feed rate.

A novel and ingenious device designed by H. S. Wilcox, block plant superintendent, is the feed arrangement which supplies the wet mix to the block machines from the Kent mixer. A conveyor belt 15 in. wide carries material up to the No. 1 machine where it is dumped into a small bin over the machine. When this bin is full it overflows onto a 12-in. belt which runs to the surge bin over the No. 2 machine. When both bins are full an automatic mercury switch is activated by means of a swinging baffle which shuts off the power to the belts and at the same time stops the mixer and also stops the flow of cement, water and aggregates. One set of controls permits either machine to be operated alone. Calcium chloride is added to the mix to speed curing during the cool months of the year.

Curing is by means of hot vapor and warm mist alternated over a 24-hr. period in the kilns and 21 days of storage in the yard before shipment. Handling into the yard and onto the delivery trucks is performed with a gasoline engine-powered lift trucks. The standard Aquatite 8-in. unit weighs about 40 lb. but the company is now starting to produce some light-

Right: View of plant showing rail siding, cement and aggregate bins



Below: Interior of block plant with workman operating block machine off-bearer



weight units made of expanded slag which weigh about 30 lb. per unit.

Slump Brick In Colors

Aquatite specializes in slump brick and block and this department is operated under the direction of Harvey Bamman. Stone, sand and cement in bags is trucked to this part of the plant from storage as required. Both slump brick and block are made in a variety of standard colors and also special colors as ordered. The colors range from white and grey to reds and greens with pastel shades of brown, buff, cream and yellow predominating. Mineral pigment colors are used for all shades except the natural cement colors of white and gray. All slump brick are 4 in. wide and 1 in., 2 in. or 3 in. thick in 8 in., 12 in. or 16 in. lengths. Block sizes are 2½- x 4- x 6-in., 4- x 16-in., and 4- x 8- x 16-in. Various degrees of slump are produced to order, and to meet the specifications of local architects who use them extensively.

The slump brick are made in stainless steel grid forms of the three varying face thicknesses. Each grid makes 24 lineal feet of brick per pour. The grids are placed on oil-coated, wood veneer pallets or panels and filled with the wet mortar which contains some lime to help the slumping qualities. The mortar is then struck off and the grid lifted by hand leaving the formed brick on the flat pallet. A light bump with a hammer provides the required slump. Mortar is mixed in a stationary mixer as it is required. Thorough cleaning of equipment is necessary to prevent intermixing of the various colors and shades.

The brick are then cured for 24 hr. in air on the pallets after which they are removed and stockpiled. Sprinkling is required to control the set during hot weather. The slump block are made in the small converted Little Giant machines using the same type mixes. They are made on individual wooden pallets and the slump is provided by vibration built in the machines. Air curing is the same as used for the brick.

Precast Products

All precast products are made in a new section of the yard previously used for warehouse and storage purposes. The large units are made in the open and the smaller, more complicated sections and units are made under cover. Concrete for all the precast products except the marbelized surfaced units is delivered to this part of the operation by the ready-mixed concrete trucks directly from the plant. All reinforcing steel for the precast units is welded on the site through the use of an up-to-date electric cutting and welding unit. Vibration for all the steel forms is provided by an air compressor operating small air hammers and vibrators.

The marbelized surfaced units, which consist of floor and wall tile, range in size from 4 x 4 in. to 24 x 24 in. and run from ¼ in. to 2 in. thick. They are all produced in a special section of the plant where they are protected from dust and dirt. The various colors are mixed with white cement, and placed in the stainless steel forms which are filled upside-down so that the colored surfaces will be formed against the smooth surface of the molds. The balance of the mix is then added and vibration is applied to give the glass-like surfaces required. Careful curing is required to prevent cracking and checking of the faces of the units. Care must also be exercised in removing the units from the one-piece molds. Special cleaning and coating oils are used on the molds of all the precast materials. The marbelized surfaced units are waxed and polished following installation on the job.



House under construction has an Aquatite foundation, joists, 24- x 24- x 2-in. marbelized floor tile, and slump block to make a decorative wall on both interior and exterior

Pittsburgh Testing Laboratory is retained to provide all tests and approve mixes for all the products and concrete produced by the company.

The entire fleet of 13 trucks, yard equipment and cranes are maintained in the modern repair shop on the company property. Trucks are always clean and freshly painted. Each truck carries good advertising, and slogans, such as "Concrete Stops Termites and Fire," are shown in bold letters over the cab of each truck. All automotive equipment is powered by propane gas. They have found that this gas gives good mileage, helps reduce overhead, and provides lower cost per mile hauling from the standpoint of motor overhauls and parts.

Yard Display

Products made and sold by the company are well displayed in the yard area around the modern office and entrance to the yards. An excellent brochure describing in detail all the company's products is distributed to the trade. Eight-two salaried and hourly workers are employed at the present time.

H. N. Davis is in charge of the precast products section, and John W. Sheffield is manager of sales. Mrs. Nelda H. Smoak is comptroller for the company.

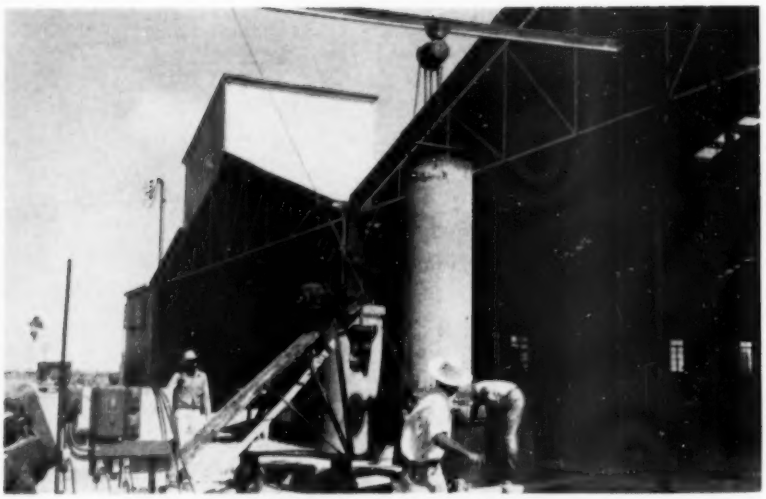
Interlocking Block

A NEW CONCRETE BLOCK, tradenamed "Formbloc," which requires no mortar, is being produced by Formbloc, Inc., and Maine Cement Products, Inc., Bangor, Maine. Described as a "precision-built, hollow concrete block, Formbloc is laid up dry and is self-aligning and intelocking at all joints by means of a tongue-and-groove type end.

No previous training is said to be required to lay up Formbloc walls. The first course is fastened to embedded bolts in the poured footing, and the succeeding upper courses are clipped to steel rods running through the continuous voids in the wall. The horizontal and vertical voids are large enough to permit the pouring of insulating material and, when completed, the interior poured concrete core has sealed all joints and spaces, becoming an integrated part of the wall itself.

Produces Veneer Block

ATLAS BUILDING PRODUCTS CO. recently announced production of a building product called "cinder-rock" at its El Paso, Texas plant. The product, a veneer-type cinder block with a natural rock finish, manufactured by splitting, can be used as an interior or exterior finish over any type of back-up. Production of the block in 2-, 3-, or 4-in. face and 16-in. long sizes has been scheduled for 3000 to 4000 units per day.



Overhead hoist and crane used in stripping core

Longhorn Concrete Pipe Co., Edinburg, Texas makes large concrete pipe in portable plant having continuous mixer, swiveling concrete elevating conveyor, and revolving head to distribute concrete into form. Operations controlled by push-button switches from central control board

STRIP CONCRETE PIPE IMMEDIATELY

Use Dry Mix and Low Frequency-High Amplitude Vibration

LARGE CONCRETE PIPE, which may be stripped immediately from the forms, are being made by Longhorn Concrete Pipe Co., Edinburg, Texas with a portable plant, using a dry mix and electric vibrators. Tests of 30-in. pipe of the modified bell-end type, with 3½-in. wall thickness and 6 ft. long, have demonstrated that non-reinforced pipe made with this process can withstand a compression load of 17,800 lb., which considerably exceeds A.S.T.M. C-118 requirements. The test for reinforced pipe of this size under A.S.T.M. C-75 requires only a 16,200-lb. load.

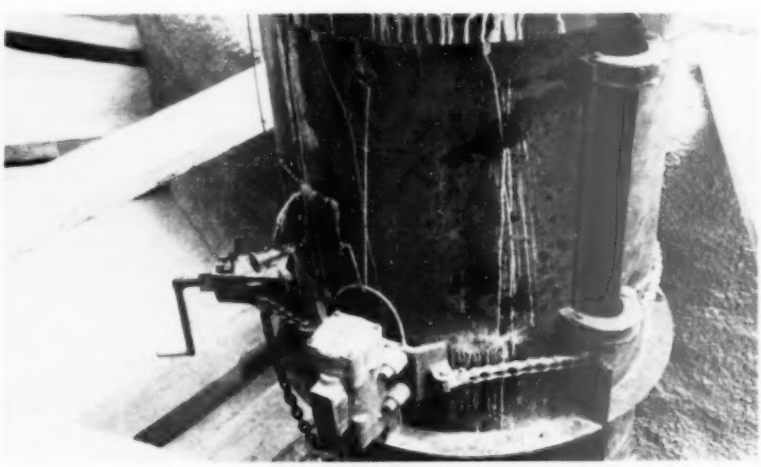
The portable plant equipment and vibration method was developed by Geo. W. Hoffmann of Geo. W. Hoffmann Co., who had observed through more than 12 years' experience in the concrete block industry the trend from tamping to vibration of dry mixes. Experiments were conducted in Mexico by Mr. Hoffmann during the past two years in which he concluded that large diameter pipe could be made in forms (such as Quinn and Universal), using a mix as dry as that which is used in tamping machines for pipe manufacture but with compaction by vibrators that provide comparatively low frequency with high amplitude for impact vibration. M. E. (Buster) Hickman, general superintendent of Longhorn Concrete Pipe Co., was responsible for working out many of the simple, common-sense solutions of the technical problems faced in setting up and operating this new plant.

Operation of the plant is very simple as one man controls the Hercules continuous mixer, elevator and the Vibromac vibrators by push-buttons on an electrical control board. Practically all the equipment comprising the plant can be loaded on a truck for transportation to the site of the job or a nearby location.

Before setting up the Longhorn plant, a pit 5½ ft. deep was dug in the form of an arc of sufficient width to accomodate the largest size pipe form. This pit was sprayed with Gunite to prevent erosion of the walls and the area immediately back of the



Pipe form ready for pouring of concrete and vibrators in place



Close-up showing vibrating assembly on pipe form



Automatic revolving loading head at end of elevating conveyor eliminates manual handling of concrete



Gunited casting pit has been dug to a depth of 5½ ft. in an arc. The pit depth is governed by the maximum height of pipe to be made

walls. Depth and width of the pit is determined by the maximum size of pipe to be made. In this case pipe up to 8 ft. long and 30 in. in diameter were being made. As shown in the plan and elevation drawing and photographs, a timber cribbing support made of discarded railroad ties bolted together is laid in the bottom of the pit to a height of approximately 1 ft. This allows about 4 ft. to the top of the pit which is one-half the height of an 8 ft. long pipe form. For 8-ft. pipe, this permits easy control of concrete flowing into the pipe from the elevating conveyor, the finishing of the tongue, and allows sufficient space for workmen to fasten on the assembly of vibrators at normal working height. The pit is shaped in an arc to permit swinging the elevating conveyor which is pivoted at the lower end where concrete is discharged from the continuous mixer into a hopper over the conveyor. The conveyor belt has cleats to prevent slippage of concrete.

Pipe Manufacturing Steps

In manufacturing pipe by this process, the first step is to place the wooden cribbing support in the bottom of the pit. This support is designed to cushion the impact of vibration which filters out of the pipe form and causes the form to "dance" on a hard surface.

A steel ring saddle with welded vertical lugs is bolted to the cribbing. This saddle receives the groove-form-



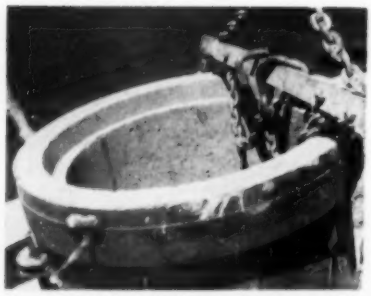
Overall view showing entire pipe manufacturing plant in operation, looking toward charging end



Cribbing with saddle and groove-forming pallet to receive pipe form



Electrical control board alongside continuous mixer. Operator controls mixer, elevating conveyor, and vibrators by push buttons



Showing finish on bell end of pipe made by this method

ing base pallet on which the outside pipe form is lowered by chain hoist from arm of stiff leg swivelling derrick. This is followed by placing the inside core which may have been removed from the freshly made pipe on the adjacent set-up of cribbing and saddle support. While the inside core is being lowered into the pipe form, workmen are fastening the two Vibromac vibrators to the outside form jacket. The vibrating assembly comprises the two vibrators connected by sections of heavy roller chain (units are 1½ in. thick by 2 in. long), a tightening device, and a section of ordinary 2-in. steel link chain. The tightening device has a hook on one side that engages a link on the 2-in. steel chain which is bolted to one side of the opposite vibrator. This arrangement permits such tension that the whole vibrating assembly is in intimate contact with the outside pipe form providing additional vibrating action. Vibrators are also supported by heavy wires that hook into the form so that they will not drop off and be damaged.

After vibrating assembly is tightened in place, the elevating concrete conveyor is rolled into place above the form. At the end of the conveyor is a funnel-shaped, stainless steel distributing head which revolves in a circle around the top of the form. It is driven by electric motor through a V-belt and pulley on a vertical shaft, as shown in one of the illustrations. Before this distributing head was devised, it was necessary to have several men trowel the concrete into form. The new distributing head eliminates the necessity for use of manual labor in this operation, provides a more uniform distribution of concrete, and there is less waste.

The Hercules continuous mixer is now started up, the vibrators go into action, and the pouring operation is under way. After approximately 2 min. pouring time, the pipe is finished. The inside core is removed immediately by the hoist, and is lowered in the pit to the next pouring set-up in the pit. A high lift truck raises the pipe form (outside jackets) with the green pipe out of the pit and places it on the curing floor where the outside jackets of the form are immediately stripped from the green pipe. The outside jackets of the form are released at once for enclosure around a new base pallet and returned by the high lift truck to the pit.



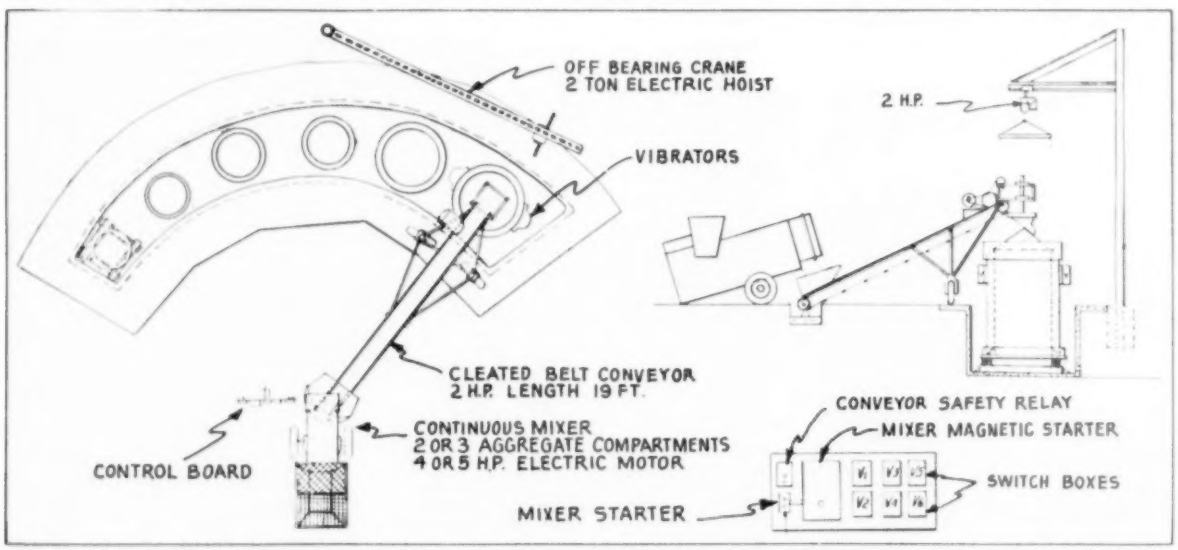
Bell-end pipe made by this process is 30 in. dia., 8 ft. long with wall thickness of 3½ in.

Finished pipe is spray cured. Illustrations of the pipe show the excellent finish of the densely compacted concrete. The concrete mix comprised 60 percent gravel, ¾-in. top size, and 40 percent sand which was rather coarse with a birds eye or $\frac{1}{16}$-in. top size. Cement comprised 13 to 15 percent of the mixture. The water-cement ratio produced a no-slump concrete. The aggregate gradation could be improved upon considerably, but available materials were used to keep down costs. In spite of the shortcomings in aggregate gradation, no difficulties were encountered in manufacture and the strength tests were gratifying. Pipe have been manufactured as an experiment with even larger gravel aggregates than ¾-in. top size with improved test strength results.

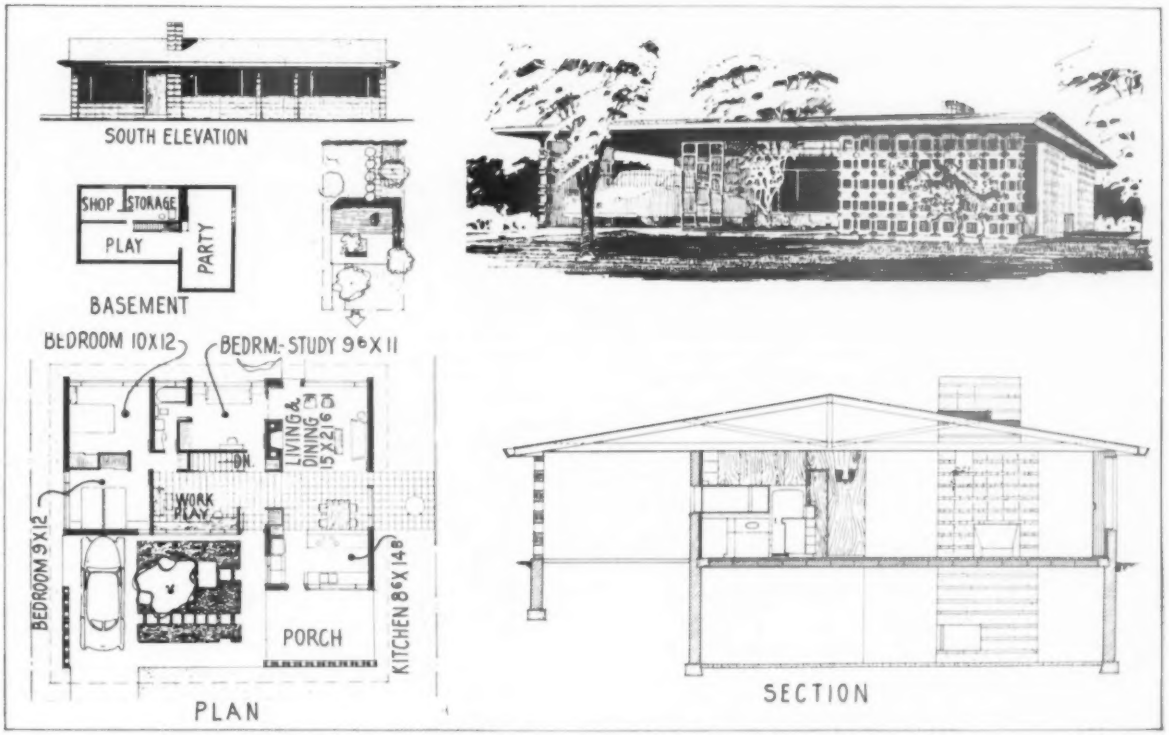
It has been suggested that this plant set-up could be easily transported to the job site with the pipe manufactured alongside or even within the trench dug for the pipe installation.

To a great extent, the manufacture of concrete pipe by vibration of forms is taking the place of the "wet-cast" method. In the process described, one form is used to make 25 to 30 pipe per day, and with two outside forms and one inside core it is possible to make 60 pipe per day.

Officials of the pipe company include H. Reising, president, and M. E. Hickman, general superintendent.



Plan and elevation details of portable concrete pipe plant; also switch-board for the control of continuous mixer, conveyor and vibrators



Plan and elevation views of small concrete masonry home design which won first prize

Nebraska Association Prize Awards for Small Homes

TWELVE CASH AWARDS were given to the winners in the Nebraska Concrete Masonry Association's competition for the best new designs for small concrete masonry homes. The awards were announced at the recent quarterly meeting of the Nebraska Architects Association, a chapter of the American Institute of Architects, which sponsored the competition. The Nebraska Concrete Masonry Association was the donor of the awards.

Kenneth B. Clark and Lawrence A. Enersen of Lincoln, Nebr., were the winners of first place and a $1000 award. Second place and a $250 award was given to a design submitted by Sidney W. Campbell and Reginald E. Davies, associated with the firm of Unthank and Unthank, also of Lincoln. Ten $50 Awards of Merit were given to designs submitted by the following: Alex Weinstein, Omaha; Clyde Bourgeois, Omaha; Mrs. Blanche Plunkett, Hastings; E. C. Gross, Lincoln; Burkett E. Graf, Lincoln; John H. Aylor, Omaha; Woodrow Hull, Lincoln; James W. Nicas, Omaha; James A. Lynch, Omaha; and Dale L. Gibbs, Roy C. Neumann, and Hedy C. Neumann of Lincoln.

Martin I. Aitken of Lincoln, professional advisor for the competition, introduced the winners at the meeting, and the awards were presented by Lew Anderson of Lincoln, president of the Nebraska Concrete Masonry Association. The winning designs were chosen from a field of 31 entries by a jury of award which consisted of Harold Spitznagle, architect from Sioux Falls, S. Dak.; James T. Lendrum, executive director of the Small Homes Council, University of Illinois; and R. E. Copeland, director of engineering, National Concrete Masonry Association.

The first place design by Clark and Enersen is for a three-bedroom house, 23 x 46-ft., with an added kitchen ell, plus covered porch and carport. It has a divided basement, and features a

(Continued on page 204)



Left to right: Lawrence A. Enersen and Kenneth B. Clark, Lincoln, Neb., receive the $1000 first prize check in the architects' competition for the best small home design using concrete products

13. A producer views the ready-mixed concrete business . . . By JAS. A. NICHOLSON*

DESIGNING A CONCRETE MIX

A READY MIXED CONCRETE PRODUCER, head of a good sized operation, admitted to me that the concrete mixes which were being used at his plant, had been provided by the superintendent at the time he had been hired away from the competitor a good many years ago. Year after year, this plant has processed many thousands of cubic yards of concrete with absolutely no changes in mix designs. In addition to losing such savings as adjustments for air entrainment would have given, this concrete man was not using the same aggregate for which the mixes were originally designed.

Before pointing the finger of scorn at this producer, let us all check the performance of our own plants. Are our mix designs accurate and complete? How efficient are plant operating controls? How competent is our plant personnel? Are we really processing and delivering a uniform quality product?

Many operators are using mixes which have been prepared for them by a representative of one of the cement companies. Some mix designs, so secured, are based on aggregate samples that the concrete producer had supplied. In certain cases the samples were not even representative of the aggregates in use. Through the years, mix designs, so originating, may have consistently earned bread and butter for the operator. It is doubtful that the quality of the concrete which was produced had an equal record for consistency.

In fact, it is extremely doubtful that many mixes of such origin, are of proper design. On the other hand, it is true that a certain percentage of these mixes have been properly designed, checked and rechecked by competent technicians of cement manufacturers' laboratories.

Even if an operator is completely satisfied that all of his regular mixes are 100 percent accurate, he should at least know enough about concrete proportioning that he is able to make an intelligent appraisal of a mix design which has been handed to him for use on a big project. In his paper on "Mix Design," Ed Brickett recently told producers at the Ohio Concrete School, "it is merely a matter of putting together the different parts of the concrete mix so that you can come out with a desired result."

There are different ways of putting these parts together. In recent years, the following methods have had the greatest effect on our industry. Mr. Goldbeck and Mr. Gray of N.C.S.A. worked out an efficient, easy to apply method. This procedure is explained in detail in "Proportioning of Concrete," a little booklet which has since been issued in pamphlet form by the National Ready Mixed Concrete Association. Fred Hubbard of the National Slag Association has published a very useful set of tables entitled "Materials Required Per Cubic Yard of Slag, Stone, and Gravel Concrete and Cement Mortar." Many state highway departments have their own tables for proportioning concrete mixes. Members who have attended the Short Course at the University of Maryland say that "Stanton Walker's method is the way to do it."

As expressed before, many in the industry feel that Mr. Walker's methods should be followed in all regular procedures. I agree generally with this feeling. I also agree with Ed Brickett's belief that "The Absolute Volume Method" is one of the easiest to explain and to understand. Many Ohio producers shared with me the privilege of hearing Mr. Brickett's clear, concise discussion of this method (based on A.C.I. 613-44) in his recent talk at the 1953 University of Toledo Concrete School.†

Producers expecting to get a working knowledge of the "Absolute Vol-

*Pres. Nicholson Concrete Co., Toledo, Ohio

†The explanation herein closely patterns Mr. Brickett's talk. Instead of gravel, crushed limestone is used as the coarse aggregate. Again the basis of the discussion is "The American Concrete Institute Mix Design Standard 613-44"—reprinted from Journal of American Concrete Institute, June 1945.

**Both of the leading tables, Goldbeck and A.C.I. 613-44, originally covered only normal cement concrete. An A.C.I. sub-committee is now preparing mix design material for air entrained concrete (see latter part of this article).

Terms and Expressions

Grading Analysis—The separation of a granular material (both fine and coarse aggregate) into various sizes by means of standard sieves so that the distribution of particle sizes can be determined.

Fineness Modulus—In the case of concrete aggregate, an empirical factor obtained by adding the total percentages of a sample of the aggregate retained on each of a specified series of sieves, and dividing the sum by 100—used in this article as the basis for determining the percentage of fine aggregate to be used in the concrete mix.

Moisture Content of Aggregate—The total water contained within the aggregate pieces (absorbed water) and on their surfaces (free water).

Saturated Surface Dry—The condition of aggregate which in its interior has absorbed all the moisture which it is capable of absorbing but contains no free surface moisture. In our discussion we are interested in the free surface moisture contents of aggregate; the absorbed moisture affects neither the volume nor the W/C ratio.

Absorbed Moisture—The water contained within the pores, cells and crevices of a material.

Free Moisture—That water which is on the surfaces of aggregates and can be removed by blotting, etc.

Specific Gravity—Is the relation between weight and volume. It is the ratio of the weight in air of a given volume of solid material—in our discussion, cement or aggregate (in a saturated surface dry condition)—to the weight in air of an equal volume of water at the same stated temperature.

Absolute Volume—The volume of an ingredient in its solid condition (without voids between individual pieces or particles). It is the actual volume occupied in concrete by the different ingredients determined by dividing the weight of each ingredient in pounds by the weight of a cubic foot of water in pounds (62.4) —e.g. sack of cement $\frac{94}{3.1 \times 62.4}$ equals 0.48 cu. ft.

W/C Ratio—According to A.S.T.M. it is "The ratio of the amount of water, exclusive only to that absorbed by the aggregates, to the amount of cement in a concrete mixture." This ratio is generally expressed as gallons of water per sack of cement (so used in this discussion) but may be expressed in a weight relationship—so many pounds of water per pound of cement.

ume" method should study this A.C.I. pamphlet.** Beginners, somewhat unfamiliar with the expressions and terms listed above, should recheck them before getting into the procedural steps of mix design.

If "Absolute Volume" is used in designing a mix for a cubic yard of concrete, the volume of the water, the absolute volume of the cement, the absolute volume of the sand and the absolute volume of the coarse aggregate must add up to a total of 27 cu. ft. If air entrained concrete is being designed, the volume of air must be included in the totals which add up to 27 cu. ft.

There are several bases on which you can design a mix. You can design to a W/C ratio, to a given strength and slump, to a given nominal mix by weight or volume, (e.g. a 1-2-4 mix) and to a minimum cement content combined with a required strength. Before deciding upon a basis for mix design, you have to decide what you want to accomplish. You must know what minimum strength, combined with a factor of safety, will give you what you want.

Consideration must be given to the variables in aggregates, cement, mixing procedures, job handling practices and testing techniques. Above all, local market conditions must be considered. Can you use local available aggregate to process a quality concrete? How dependable are the supplying plants? What safeguards are necessary? How efficient are the supervising engineers? What percent of 28-day strength can be expected in 7 days? How much improvement can you expect of 28-day concrete over 7-day results?

To work out a mix design by any of the several methods, there are certain pertinent facts that must be known about materials which are going into the concrete. Different methods may require different facts. For the successful working out of all the methods, it is important that essential, previously determined facts, be accurate.

In designing by Absolute Volume, the fineness modulus of the sand and the specific gravities of the cement and the aggregates (saturated surface dry) must be known. To work with your own materials, these facts as to cement and aggregates must be determined in advance.

Let us assume that we are going to put together some sand-crushed stone concrete in which the sand has an F.M. of 2.94, cement, a specific gravity (S.G.) of 3.15; sand a specific gravity (S.S.D.) of 2.65 and crushed stone a specific gravity (S.S.D.) of 2.68. Let us further suppose that we have been told to design a non-air-entraining mix using 5 bags of cement per cu. yd., 1½ in. top size stone and having a 4- to 6-in. slump.

On Page 655 (A.C.I. 613-44) is Table No. 5 which is the meat of the whole Absolute Volume Method.

Table 5 covering both rounded and angular coarse aggregate includes sections on maximum size of coarse aggregate, sand percent of total aggregate by absolute volume and net water content per cubic yard. A section is also included which provides adjustment for factors and conditions involving both the aggregates and the intended use of the concrete.

TABLE 5: APPROXIMATE SAND AND WATER CONTENTS PER CUBIC YARD OF CONCRETE

Based on aggregates of average grading and physical characteristics in mixes having a W/C of about 0.57 by weight or 6½ gallons per sack of cement; 3 inch slump, and natural sand having a F.M. of about 2.75.

	Rounded Coarse Aggregate			Angular Coarse Aggregate		
Maximum Size of Coarse Aggregate	Sand Percent of Total Aggregate by Absolute Volume	New Water Content Per Cubic Yard		Sand Percent of Total Aggregate by Absolute Volume	New Water Content Per Cubic Yard	
Inches		Pounds	Gallons		Pounds	Gallons
½	51	335	41	56	360	44
¾	46	310	37	51	335	40
1	41	300	36	46	325	39
1½	37	280	34	42	305	37
2	34	265	32	39	290	35
3	31	250	30	36	275	33
6	26	220	26	31	245	29

ADJUSTMENT OF VALUES IN TABLE 5 FOR OTHER CONDITIONS

Changes in Conditions Stipulated in Table 5	Effect on Values in Table 5	
	Percent Sand*	Unit Water Content*
Each 0.05 increase or decrease in water-cement ratio	1	0
Each 0.1 increase or decrease in F.M. of sand	-½	0
Each 1 in. increase or decrease in slump	3	3%
Manufactured sand (sharp and angular)	+3	+15 lb.
For less workable concrete, as in pavement	-3	— 8 lb.

* (+) indicates an increase and (—) a decrease corresponding to the conditions stated in the first column.

Table 5 is simply a standard to go by. As the materials or conditions vary from the standard, adjustments are made to compensate for the difference. The suggested changes are simple and easy to remember.

For each 0.05 increase or decrease in water-cement ratio, you increase or decrease the percentage of sand one point. Does this adjustment make sense to you? Can you explain satisfactorily the reasons for this adjustment?

For each 0.1 increase or decrease in F.M. of the sand you raise or lower the sand content ½ percentage point; e.g., a lower fineness modulus means that you have a finer sand and that, consequently, you will need less total sand.

For each inch increase or decrease in slump, you increase or decrease the water content 3 percent—this, of course, is an operating procedure well known to all ready-mixed concrete producers who sensibly attempt to control the quality of their concrete. As Table 5 was designed for 3-in. slump concrete and we are going to proportion for 5-in. slump concrete, an adjustment upward will have to be made in the water content.

The adjustments in both water and sand contents, necessary changes when a sharp manufactured sand is used, are well understood by operators who use this type of aggregate.

Similarly the final adjustment to be made when less workable concrete for use in pavement is to be processed, follows regular operating practice in reducing the sand three percentage points and cutting back on the water 8 lb. per cu. yd.

We immediately note some differences from the standards shown in Table 5 and the concrete to be processed.

	Table 5	Our Concrete
Slump	3 in.	5 in.
F.M. of sand	2.75	2.94

Table 5 specifies that with concrete containing crushed stone up to 1½ in. maximum size, 305 lb. of water should be used to produce a 3-in. slump. It is our intent to produce 5 in. slump concrete. Naturally, added water will be required. To compensate for this slump difference, we must adjust the value shown in Table 5. As the adjustment calls for a 3 percent increase in water content for each added inch of slump, the amount of water is increased by 6 percent (18 lb.) to a total of 323 lb. of water.

From our facts—water, 323 lb.; cement 5 bags (470 lb.)—we are now able to determine the water-cement ratio (which we will hereafter designate by W/C). We find the W/C by dividing the pounds of water by the pounds of cement—$\frac{323}{470}$ equals 0.69.

Our next job is to find the approximate percentage of sand which should be used in the 5 bag—1½ in. top size stone—5 in. slump concrete. In Table 5 for 1½ in. stone and 0.57 W/C, it is stated that the total aggregate should include 42 percent sand. However, there are several differences in the mix we are designing as compared with the concrete set forth in Table 5. Instead of a 0.57 W/C we have a 0.69 W/C; instead of a 2.75 F.M. of sand we have a 2.94 F.M. Adjustments must be made in the sand content to compensate for both these differences.

On the water-cement ratio we have a difference of 0.12 (from 0.57 to

0.69). Table 5's adjustment schedule specifies that for each increase of 0.05 in the water-cement ratio we are to add 1 percent of sand. To compensate for this difference, we should change our sand content from 42 percent to 44 percent.

On the F.M. of sand we have a difference of 0.19 (from 2.75 to 2.94). A look at Table 5 tells us that we should increase the sand ½ percent for each 0.1 increase in F.M. As we have a 0.19 difference in F.M., we compensate for this difference by increasing the sand (2 x ½ percent) or another percentage point. Based on solid volume in the S.S.D. condition, we have established that in our trial mix, 45 percent of the total aggregate should be sand.

We have now accumulated enough facts and figures to proceed with our calculations. From the properties of the materials which we are going to use, we know the following:

F.M. of sand is 2.94
Specific gravity of cement is 3.15
S.G. (saturated surface dry) of sand is 2.65
S.G. (S.S.D.) of stone is 2.68

From our work with Table 5 up to this point, we have established that we propose to use in a cubic yard of (0.69 W/C) concrete, 323 lb. of water and a sand content which will be 45 percent of the total aggregates (yet to be determined).

On Page 652 of the A.C.I. pamphlet 613-44, there are listed six steps which should be followed in determining a trial mix for initial field use. These six steps will be listed directly below as they appear in the A.C.I. pamphlet with listings from (a) through (f):

Actually at this point all the information needed to compose a trial mix has been gathered. Because the amount of water is known, we can determine the volume of water which will make up a given part of the concrete. Similarly because the amount of cement to be used is known—5 sacks (470 lb.), the solid volume of the cement in the concrete can be determined.

After both the volume of the water and the volume of the cement has been established, by combining them the solid volume which the paste is going to occupy in the cubic yard of concrete is determined. When the volume of the paste has been computed, all we have to do is to deduct that number of cu. ft. from 27 cu. ft. (27 cu. ft. in a cu. yd.) to determine the combined volume of sand and coarse aggregate which comprise the balance of materials in concrete (except when designing for air-entrained concrete which will be discussed later). Because we have already determined that of the total aggregate we intend to use 45 percent sand, it is comparativly easy to determine not only the volume of the stone, but also the weights of both the sand and coarse aggregates.

In a sentence we have said this—because we know the cement and water contents, we know the volume of the paste which allows us to quickly determine the volume of the combined aggregate; as we have established the percentage of sand (45 percent of the solid volume of the combined sand and gravel) which we will use in our trial mix, the remaining space in 27 cu. ft. will be occupied by a certain volume of 1½ in. down stone so the correct aggregate weights can be quickly determined.

Having shown how simple it is to put these computations together, it should be time for actual figures. However, as we begin to line up our figures, somebody is going to get lost over the meanings of absolute volume and specific gravity. Those who are not clear about these expressions should restudy the definitions which have been given and should carefully read the next several paragraphs.

Now is the time to realize that the solid materials which we use in concrete are not exactly solid. Each material—cement, sand or stone—alone in a container will have a great deal of air spaces or voids. In the dry rodded condition of compaction, a well-graded stone will have about 39 percent voids; a well graded sand approximately 32 percent voids, and cement of 3.15 sp. gr., 52 percent voids. In dense quality concrete, these materials are put together with water in a way that almost completely eliminates the voids. Actually into a cubic yard (27 cu. ft.) of concrete we put approximately 5.18 cu. ft. of water, 12.55 cu. ft. of compacted sand, 17.53 cu. ft. of compacted stone and 5 cu. ft. of cement, or a total of 40.57 cu. ft. of separate ingredients, to make one cubic yard of consolidated concrete.

Any material that is not completely solid has voids in it. Absolute volume is the solid volume of any material—the volume (or space) that material occupies after all the voids are removed. In concrete when these voids are occupied by other materials, the part occupied by a given material is its absolute (real) volume; e.g., a sack of cement is called a cu. ft. of cement—actually in concrete a sack of cement will occupy less than ½ cu. foot space. The absolute volume of a sack of cement is $\frac{94}{3.15 \times 62.4}$ equals 0.48 cu. ft. which is the actual space a sack of cement occupies in concrete.

The absolute volume of a cubic foot of sand (used in our example) weighing 106 lb. is 0.64 cu. ft. What formula do we use to get this answer? $\frac{106}{? \times 62.4}$ equals 0.64.

We are now ready to establish the absolute volume of these materials which when combined together with water will make a cubic yard of concrete. In each case volume will be expressed in cubic feet.

We get the volume of water by dividing the weight of water to be used (323 lb.) by weight of water per cubic foot which gives us $\frac{323}{62.4}$ or 5.18 cu. ft. This figure for water when combined with the absolute volume of cement will give us the volume in cubic feet to be occupied by the paste. We determine the absolute volume of the cement by working out the formula—$\frac{470}{3.15 \times 62.4}$ or 2.39 cu. ft.

When we use the specific gravity of

Steps in Determining Trial Mix

(a) Select the water-cement ratio from test data, experience or established relationships, to meet the specified requirement for durability and strength (compressive and flexural).

From the specifications, we were told to use 5 bags (470 lb.) of cement and on the information gained from Table 5, we have learned that we should use 323 lb. of water. By these two figures, we have established the W/C to be $\frac{323}{470}$ or 0.69.

(b) Select the limits of slump that will permit proper handling and consolidation of concrete under the job conditions involved.

The assumed specifications called for a 4-in. to 6-in. slump, and we are going right down the middle by designing for a 5-in. slump.

(c) Determine the largest size of available aggregate suitable for use under job conditions.

The specifications generally determine what top size aggregate should be listed under step (c), then one should refer to Table 4 of this same A.C.I. 613-44 pamphlet. In our problem, we have decided to use 1½ in. coarse aggregate.

(d) Estimate from test data, experience or established relationships, the minimum percentage of sand that will provide the proper degree of workability.

Having used Table 5 as a reference and having compensated for the differences in the W/C ratio and the F.M. of sand, we have established that 45 percent is the amount of sand which will provide the proper workability.

(e) Estimate the amount of water per cubic yard of concrete that will be required to fulfill the conditions of steps (b), (c) and (d).

Having established that we are going to make concrete of 5-in. slump (step (b)), 1½-in. stone (step (c)) and 45 percent sand (step (d)), we have already computed from Table 5 that we will use 323 lb. of water in the trial mix.

(f) Compute the trial mix proportions that conform with the factors determined in steps (a) to (e). Make such adjustments in the trial mix on the job as may be necessary.

any of these materials other than water, we are simply showing the relationship of the weight of that material to an equal volume of water.

By adding the volume of water and the absolute volume of cement together, we establish the volume of paste in the concrete—5.18 cu. ft. of water plus 2.39 cu. ft. of cement gives us 7.57 cu. ft.

To find the volume of the total aggregate, we simply need to deduct the volume of the paste from the volume of a cubic yard of concrete—27 minus 7.57 which gives us 19.43 cu. ft. From the adjustment schedule for Table 5, we have learned that 45 percent of the total aggregate is to be sand—hence 45 percent of 19.43 cu. ft. is 8.74 cu. ft. which is the solid volume of sand in the concrete. We get the solid volume of the coarse aggregate by deducting the solid volume of the sand from the solid volume of the total aggregate or 19.43 minus 8.74 cu. ft. equals 10.69 cu. ft.

To get the weight of sand saturated surface dry (see definition), we multiply the solid cubic feet of sand by its specific gravity times the weight of a cubic foot of water or 8.74 x 2.65 x 62.4 which gives us 1445 lb. of sand in a saturated surface dry condition.

Similar thinking establishes the weight of saturated surface dry stone —10.69 x 2.68 x 62.4 or 1788 lb. of stone.

We have determined our first trial mix to be:

Material	*Pounds*
Cement	470
Sand	1445
Stone	1788
Water	323

Now explain to yourself why 323 lb. of water gives you a volume of 5.18 cu. ft., while from 470 lb. of cement you get a volume of only 2.39 cu. ft. Before leaving the above figures, make certain that you understand the meanings of absolute volume and specific gravity (different types).

Having determined upon a trial mix, the time for exercising good horse sense has arrived. Now should be considered the uniformity of the aggregates, efficiency of batching and mixing procedures, weather conditions, length of haul, structure requirements and job practices.

We take our trial mix calculations and compensate for the conditions which prevail. A check upon the moisture content of our aggregate shows these conditions:

	Sand	*Stone*
Total moisture content	5.5%	1.5%
Moisture Absorption	0.6%	1.0%
Free moisture	4.9%	0.5%

The absorbed moisture does not affect the volume; neither is it available to affect the water ratio. By deducting the absorption percentages from the total moisture contents we determine the amounts of free moisture present in each material.

In converting a trial mix into a field batch we must take into account the free moisture of both aggregates —sand, 4.9 percent; stone, 0.5 percent. Moisture present in the aggregate must be deducted from the water content and compensating additions must be made to the weight of aggregates.

ADJUSTED FIELD BATCH

TRIAL MIX	(LBS.)	ADJUSTMENT	ADJUSTED WEIGHTS (LBS.)
Cement	470		470 lbs.
Water	310	—4.9% or 71 lbs. —0.5% or 9 lbs.	
		80	230 lbs.
Sand	1445	plus 71 lbs.	1516 lb. equals 1520 lbs.
Stone	1823	plus 9 lbs.	1832 lbs. equals 1830 lbs.

ORIGINAL FIELD BATCH

BASIC	TRIAL MIX (LBS.)		ADJUSTMENTS	ADJUSTED WTS. (LBS.)
Cement	470			470
Sand	1445-4.9% or	71		1520*
Stone	1788-0.5% or	9		1790*
Water	323	80	less 80 lb. free water in the aggregate	243 (29.3 gal.)

*To be practical, always adjust material weights to closest even figures.

Having figured out a field batch, the next step is to work with the concrete itself. We can make up a whole batch or any part (e.g. 1/10th) of a batch. Upon completion of processing we examine the mix. Generally some adjustments are necessary. Supposing we found the slump to be 6⅜ in. instead of the desired 5-in. slump. Apparently we need to reduce the water by 1.375 x 3 percent or 4.13 percent which is about 13 lb. or 1.6 gal. less than calculated. Taking out 1.6 gal. will leave us about 13 lb. (or the equivalent of 0.21 cu. ft.) low on volume. Because the mix has ample sand and is free from segregation, we decide to add 35 lb. of stone which will have the same solid volume as the water removed.

To make these changes on the water and stone contents in a realistic fashion, we must effect changes in our basic trial mix.

Again we have to correct the adjusted trial mix to compensate for the free moisture condition of our aggregates—sand, 4.9 percent and stone, 0.5 percent (Where did we get these percentages?). On the adjusted trial mix, we were again working with sand and stone, both of saturated surface dry materials. The water content must be reduced, with the aggregate weights adjusted upward to compensate for the free moisture which they contain.

We have completed a field batch. The weights are ready to use.

The first few times you go through the mechanics of designing a mix—preparing a trial mix, setting up an original field batch, processing the first batch of concrete, redesigning the trial mix, then compensating for an adjusted field batch—the whole routine seems confusing and laborious. After you have been through the mechanics of designing a mix several times, the routine appears less cumbersome, procedural steps fall into a natural pattern and accurate results are quickly obtained.

In the mix design which we have just completed, we assumed that we were told to proportion materials for 5 bag—1½ in. stone—4-6 in. slump concrete. We further assumed certain properties about the materials. The little A.C.I. pamphlet 613-44 supplied

BASIC TRIAL MIX	LBS.	ADJUSTMENTS	WEIGHTS	CORRECTING VOLUME	ADJUSTED VOLUME
Cement	470				2.39 cu. ft.
				310	
Water	323	minus 13 lbs.	310	62.4	4.97 cu. ft.
				1445	
Sand	1445		1445	2.65 x 62.4	8.74 cu. ft.
Stone	1788	plus 35 lbs.	1823	1823	
				2.68 x 62.4	10.90 cu. ft.
				calculated yield	27.00 cu. ft.

Having adjusted the volumes on water and sand it is easy to set up the adjusted trial mix.

	ADJUSTED TRIAL MIX	CU. FT.	WEIGHTS IN LBS.
	310		
Volume of water	62.4	4.97	310
	470		
Volume of cement	3.15 x 62.4	2.39	470
Volume of paste (Absolute)	4.97 x 2.39	7.36	
Absolute Volume of Aggregate	27-7.36	19.64	
Absolute Volume of Sand	1445 / 2.65 x 62.4	8.74	1445
Absolute volume of Stone	19.64-8.74	10.90	
		10.90 x 2.69 x 62.4 equals 1823 lb.	

the remaining answers. Provided pertinent information is known about the aggregates and other ingredients which are going into the concrete, you can get good accurate answers with this simplified practice based on absolute volume.

It might well be that a specification calls for a water-cement ratio coupled with a required top sized aggregate. A.C.I. 613-44 will take you quickly through the jumps; e.g., suppose that 0.69 W/C 5-in. slump concrete using 1½-in. stone is specified (we use this requirement to tie back into the figures with which we have just finished working).

Also assume cement Type 1.—Specific gravity, 3.15

Sand —F.M. 2.94
S.G. saturated surface dry 2.65
Free moisture 5 percent

Stone S.G. (S.S.D.) 2.68

Working with 1½-in. stone, Table 5 says that 305 lb. of water will be required for a 3-in. slump. The given 5-in. slump, by the adjustment schedule for Table 5, requires an increase of 6 percent water content or 18 lb. to a total water content of 323 lb. The cement content is determined by dividing the net water content by the water-cement ratio or $\frac{323}{.69}$ equals 469 lb. or 5 sacks. From this point on, the steps are just the same as we have been through.

Similarly with a strength specification (using the same materials) 613-44 in its few pages, helps you to quickly determine upon a reasonable accurate mix design; e.g., 3000-lb. concrete was specified. Turning to Table 2 on page 654, we find that the closest strength figure to and above 3000 lb. is the one of 3200 lb. which, with 7 gal. of water per sack of cement, has a 0.62 W/C. We turn again to Table 5. Using 1½-in. stone, 305 lb. of water are to be used. If we are shooting for 4-in. slump, the adjustment schedule tells us to add 3 percent water or 9 lb. to give total water content of 314 lb.

Having both the total amount of water and the water-cement ratio, the cement content is determined by dividing the weight of water by W/C or $\frac{314}{0.62}$ which gives 502 lb. of cement. Again we have the facts to proceed with our trial batch calculations, provided we know the properties of our materials—specific gravity of cement and aggregates (saturated surface dry), moisture condition of the aggregates and the F.M. of the sand.

The procedure from here on is the same that we have been through—working out the six steps of the trial mix, correcting for material conditions, preparation of the first field batch, making changes in the mix to give the concrete we want, readjusting our trial mix and coming up with a field batch which fits the picture. If you are not familiar with this absolute volume of mix design, it might be worth while to select a W/C based on your own ¾ in. aggregate and at this time work out a problem of your own choosing.

Compensation For Air

With the rapidly increasing use of air-entrained concrete, it is well worth while going through steps necessary to design a mix containing entrained air. The A.C.I. Committee which developed the Recommended Practice for The Design of Concrete Mixes (613-44) did not carry through with a method for compensating for the purposeful entrainment of air in concrete.

In the National Ready Mixed Concrete Association Research Laboratory at The University of Maryland, there was developed a graph titled, "The Effect of Entrained Air on Mixing Water." Later on, Stanton Walker and Delmar Bloem prepared a table based on this graph (see table 4, page 7—National Ready Mixed Concrete Association pamphlet titled "Control of quantity of Entrained Air in Concrete"). These same laboratory studies form the basis for the table listed below:

MIX DESIGN—ADJUSTED TRIAL MIX

Richness of Mix	2% Air		4% Air		6% Air	
Sacks cement per cu. yd.	Gal.	lb.	Gal.	lb.	Gal.	lb.
4.5	3.0	25	5.2	43	6.6	55
5.0	2.4	20	4.0	33	5.0	42
5.5	2.0	17	3.2	27	4.2	35
6.0	1.7	14	2.7	23	3.5	29
6.5	1.4	12	2.4	20	3.0	25

With this handy table, calculations for standard mixes can quickly be adjusted to compensate for air entrainment.

As was pointed out in the discussion of Air Entrained Concrete, whenever purposeful air becomes an ingredient in concrete, equivalent bulking is going to occur. If 4 percent air is added, the concrete (27 cu. ft. in volume) is going to be increased 1.08 cu. ft. to a total in excess of 28 cu. ft. To the extent of 1.08 cu. ft. we have blown up the concrete. Adjustments are again necessary. Something has to be taken out to bring the volume back to 1 cu. yd.

Whenever air is made an ingredient, concrete of the same slump requires less water. This phenomenon is recognized by table shown below. From that table, it is easily determinable that with the 5-bag concrete (with which we have been working), the introduction of 4 percent air will necessitate a reduction in water of approximately 4 gal. (33 lb.). As there are 7½ gal. of water in a cu. ft. the water content is cut back $\frac{4.0}{7.5}$ or 0.53 cu. ft.

Something else (1.08 cu. ft. minus 0.53 cu. ft. leaves 0.55 cu. ft.) has to be taken out to return the volume of concrete to 1 cu. yd., and it is logical to take out some of the sand because entrained air adds so greatly to workability that less sand is actually needed. Since we need to reduce the total volume by 0.55 solid cu. ft., the weight of sand which will equal this volume is found by multiplying absolute volume (0.55) x specific gravity (2.65) x weight of water (62.4) equals 91 lb. The introduction of 4 percent air permits a cut back in water of 33 lb., and in sand, 91 lb. in the saturated surface dry condition. (Note: If you have not had experience working with mix design, make certain that you understand where we got these figures before proceeding.)

To make adjustment for the bulking of concrete due to the purposeful entrainment of 4 percent air, it is necessary to return again either to the original trial mix or to the adjusted trial mix (aggregates in a saturated surface dry condition). To save time and space, we will show the effect only upon the adjusted trial mix (see table, below).

To determine the field batch which will be used after 4 percent air has been added, it will again be necessary to adjust weights on the water and aggregates to compensate for the

(Continued on page 204)

MIX DESIGN—ADJUSTED TRIAL MIX

	Weight in lb.	Air Entrainment Changes	Final Trial Mix
Cement	470		470 lb.
Water	310	minus 33 lb.	277 lb.
Sand	1445	minus 91 lb.	1354 lb.
Stone	1823		1823 lb.
Air		plus 1.08 cu. ft.	1.08 cu. ft.

FIELD BATCH WITH 4% ENTRAINED AIR

	Weight in lbs.		Adjustments (lb.)	Corrected wts. Field condition	Abs. Vol. Cu. ft.
Cement	470			470	2.39 cu. ft.
Sand	1354	(S.S.D. condition)	4.9% —66	1420	9.25 cu. ft.
Stone	1823	(S.S.D. condition)	0.5% — 9	1832	11.04 cu. ft.
Added Water	277		minus 75	202	3.24 cu. ft.
Air—Add sufficient air entraining agent to obtain 4% air.					1.08 cu. ft.
					27.00 cu. ft.

PIPE MEN GO TO SCHOOL

American Concrete Pipe Association holds three-day short course school of instruction sponsored by Technical Problems Committee

By HUBERT C. PERSONS

ONE HUNDRED AND FIFTY-EIGHT MEN were registered for the third annual short course school of instruction of the American Concrete Pipe Association at the Hotel Sherman in Chicago, September 10-12. Those attending were principally concrete pipe plant managers, production superintendents and engineers, according to Howard F. Peckworth, managing director of the pipe association. Some of the nation's leading authorities on various phases of concrete technology participated in the sessions.

The growing importance of the pipe association's technical problems committee, under whose auspices the study courses are given, was emphasized by Ivy H. Smith, the association's president, at the opening session. He revealed for the first time that a foundation has been established at Tulane University in New Orleans to undertake intensive study of problems resulting from the presence of hydrogen sulphide in sewers. This foundation was set up only recently by the hydrogen sulphide committee, a subcommittee of the technical problems group.

Mr. Smith, who is president of the Sherman Concrete Pipe Co. of Jacksonville, Fla., explained that the short course schools are intended to familarize plant men, as well as others, with the special problems of the concrete pipe industry and with the valuable data resulting from the association's technical research activities. Each of the three short course study schools held thus far, Mr. Smith said, has exceeded all expectations both in attendance and the interest displayed.

The program on the opening day was devoted specifically to the various factors influencing the production of quality concrete. The second day subjects were all related to pipe plant equipment and methods of manufacture. Panel discussions of manufacturing problems occupied the entire program on the third and last day. The panel members, all well-known manufacturers, undertook to answer 49 specific questions submitted in advance by members of the association from all parts of the country. John G. Hendrickson, the pipe association's research engineer, presided at the various sessions.

Concrete Admixes

A symposium on "Experience with the Use of Various Concrete Admixes," was the first program feature. Speakers on the symposium and the subjects handled by each were as follows:

"Pozzolans," Craig J. Cain, Continental Concrete Pipe Corp., Chicago; "Santomere S," H. W. Huddleston, Choctaw, Inc., Memphis, Tenn.; "Hydropel," R. L. Hoover, American Bitumuls and Asphalt Co., San Francisco, and "Calcium Chloride in Concrete," William E. Dickinson, Calcium Chloride Institute, Washington, D. C.

Craig Cain's talk, illustrated with lantern slides, described the antiquity of pozzolanic materials as known in Europe and said there had been a recently awakened interest in pozzolans in the United States.

Pozzolans, Mr. Cain said, fall into four classifications which he listed as follows:

(1) Volcanic ashes and tuffa (including pumicite).

(2) Silicious sedimentary rocks, such as diatomaceous earth.

(3) Burnt clays and shales.

(4) Industrial by-products such as ground brick and fly ash.

Many natural pozzolans are available in the western part of the United States, Mr. Cain said, some of which may be used just as they occur in nature.

"Throughout the East and Middle West, fly ashes are available at very economical cost," Mr. Cain said. "You should be aware," he warned his fellow pipe manufacturers, "that fly ash from different sources may vary appreciably in their desirable properties as a constituent in concrete and, even when obtained from the same source, fly ash may not be of uniform quality. Presently there is no standard A.S.T.M. specification for fly ash. However, that organization is working toward that end now, recognizing the growing importance of fly ash in concrete."



Craig J. Cain, Continental Concrete Pipe Corp., Chicago, Ill.

Some producers of fly ash, Mr. Cain said, have set up and are meeting uniform specifications. He said that Chicago is one of the best sources of supply for fly ash and that fly ash is shipped from Chicago to points as far away as Texas, Colorado, Florida and Montana.

Use of pozzolans would give concrete pipe manufacturers numerous advantages, Mr. Cain said, including the following: increased resistance to attack by sulphates and sulphuric acid; lower heat of hydration resulting in less hair checking on inside of pipe stored in yards; reduction of core burns on tamp machines or head burns on packerhead machines; better workability of concrete mixtures; better compaction; smoother, better looking pipe; easier stripping in kilns; less abrasive wear on machine parts; and saving in material cost.

Mr. Huddleston discussed the use of wetting agents in concrete mixtures, referring specifically to Santomere S, a product made by the Monsanto Chemical Co.

Mr. Hoover, in his talk on Hydropel, went into considerable detail on volumetric changes which occur in concrete because of temperature variations. "The most destructive of the natural forces of weathering," he said, "is the freeze-thaw action while the concrete is wet or moist."

He said another "common destructive force affecting concrete is the chemical action of alkaline and neutral salt solutions." He referred to the use of salt to melt ice on highways as typical of one of the destructive forces. "The real villain," he said, "is the presence of moisture in the concrete that entered via capillary absorption."

Mr. Hoover advocated the use of bitumen in concrete mixtures to offset these destructive forces. He stated that by adding 8 gal. of a chemically emulsified asphalt to each cubic yard of a concrete mix, certain desirable characteristics would be obtained. These advantages, he said, included reduction of capillary absorption; less segregation in the mix; greater resistance to freezing action and in-



Wm. E. Dickinson, Calcium Chloride Institute, Washington, D. C.

creased strength under impact resulting in reduction of breakage during handling of pipe.

In discussing the use of calcium chloride in concrete, Mr. Dickinson, the closing speaker on the symposium, said experience has shown that time of initial set of a concrete mixture is reduced from three hours to one hour by using calcium chloride as an admixture. Final set, he said, is reduced from six hours to two hours. He asserted that the use of calcium chloride permits pipe to be steamed earlier, increases both early and ultimate strength and allows a reduction in the amount of water in wet mixes. His talk was illustrated with colored slides.

Mix Design

Data on weight, absorption, specific gravity and percentage of voids in concrete examined in four different pipe plants was explained graphically on a blackboard by Edward M. Brickett, Hume Pipe of New England, Inc. Swampscott, Mass. His talk was on "Design of Concrete Mixes and Demonstrations of Basic Calculations of Yield and Batch Weights." He presented an analysis of the weights of A.S.T.M. samples from 18-in. plain concrete pipe under varying conditions of moisture. He showed moisture contents ranging from 2.9 percent in the yards to 3.55 percent absorption during a 24-hr. soaking period and 4.64 percent absorption after 5 hrs. of boiling. Twenty samples, Mr. Brickett said, followed about the same ratio. Weights of pipe concrete per cubic foot, the speaker said, ranged from 131.6 lb. to 150.0 lb. in 13 samples. The lightest sample showed an absorption of 7.7 percent; the heaviest, an absorption of 4.2 percent.

Calculations presented by Mr. Brickett showed 10 percent of voids by volume in a cubic foot of the concrete being examined. This, he said, was made from a batch consisting of 188 lb. of normal cement; 500 lb. of sand, (2 percent moisture); 550 lb. of crushed gravel (1 percent moisture) and 5½ gal. of water.

"It has been established by T. C. Powers, (A.C.I. 1946) that the amount of water which actually combines with the cement during hydration," Mr. Brickett said, "is 18 percent by weight for regular cement (20 percent for high early strength cement). Any additional water added or in aggregate, exists as drops and causes voids in the concrete. These voids take up most of the water. It is also obvious that as the voids increase the strength of the concrete will decrease. With the above batch data, it is possible to calculate the voids in the concrete and to show that in the absorption tests, (5 hr. boil) the amount of water absorbed by the concrete was the water to fill these voids plus the water absorbed by the sand and gravel and by the hardened cement paste (cement plus 18 percent of water no longer existing as water)."

Explaining how his figures were derived, Mr. Brickett said, "First it is necessary to have a clear understanding of specific gravity and absolute volume (solid volume.) Specific gravity is the relation of the weight of any material, such as stone, to the weight of an equivalent volume of water.

"For example," Mr. Brickett continued, "a typical limestone may have a specific gravity of 2.67. That means that it weighs 2.67 times as much as water. Water weighs 62.4 lb. per cu. ft. A solid block of limestone one foot on each side would have a volume of one cubic foot and would weigh 2.67 x 62.4 lb. or 166.5 lb.

"Now, a cubic foot measure filled with crushed limestone," Mr. Brickett continued, "will not weigh 166.5 lb. because there are voids or air spaces between the particles. It would be common to find a cubic foot of crushed limestone weighing 103 lb. In other words, the measure contains only 103 lb. of limestone instead of 166.5 lb., the weight of one solid cubic foot. The actual volume of the 103 lb. measure of limestone is .62 cu. ft. This figure, the actual volume, absolute volume or solid volume is found by dividing the actual weight of material by the specific gravity times the unit weight of water."



Hal W. Huddleston, Choctaw, Inc., Memphis

Mr. Brickett explained that by knowing the batch weights the absolute volume of the batch ingredients in a cubic foot of concrete can be determined. These calculations were worked out in detail on a blackboard. The same calculation, Mr. Brickett said, was made with six additional samples of concrete, substantiating the 18 percent water-cement figure referred to earlier.

Aggregate Characteristics

Stanton Walker, Washington, D.C., director of engineering of both the National Sand and Gravel Association and the National Ready Mixed Concrete Association, was the first speaker at the afternoon session on September 10. His subject was, "Aggregate Characteristics and Their Influence on the Properties of Concrete."

"High strength and high quality of concrete are not necessarily synonymous," Mr. Walker said. He declared that it is unfortunate that aggregates vary widely in quality.

"The cost of aggregates is of outstanding significance," the speaker told the pipe men. "You must use the aggregates most widely available because of the high cost of transporting aggregates. Hence you must achieve a fine balance between cost and quality."

Mr. Walker referred to the American Society for Testing Materials as a source of specifications in the construction field. In measuring quality, he said, it is necessary to know how to make tests. A book on A.S.T.M. tests is available from that organization, he said.

"The size and grading of aggregates," Mr. Walker continued, "should be such as to require the least amount of water. This is another way of saying that the goal is concrete of maximum density. Roughly speaking, the best grading of aggregates is the coarsest consistent with workability. Remember that the A.S.T.M. specifications on grading were written for national application and hence are broad. Excessive use of aggregate of any one size is objectionable. With proper cubical particles, concentration of any one size of aggregate can be controlled. Theoretically, grading is controllable," the speaker said, "but to be practical it must reflect the availability of materials.

"Hardness and strength loom importantly as they reflect durability," Mr. Walker said, "but they have almost no effect on compressibility. These qualities are more clearly revealed in flexural strength and are important in resistance to abrasion."

The Los Angeles rattler test, Mr. Walker said, is the most commonly accepted test for hardness of aggregates. Exceptionally hard aggregate,

he said, might be a handicap. Smooth, hard aggregate, he suggested, doesn't always bond as well as rougher aggregate.

Mr. Walker emphasized the need for a testing method for performance evaluation of concrete. While there have been advances in nondestructive testing a performance test is badly needed, he said. He cited as an example the fact that there is now no certain way to assure the non-alkalinity of concrete.

"Petrographic and quick chemical tests are not satisfactory," he said. "The mortar bar test is a performance test but takes a year or two and indicates only 'maybe.' Sodium or magnesium sulphate tests are an indication of whether an aggregate is durable."

Portland Cement Developments

A paper on "Types of Portland Cement—Their Characteristics and Uses," by William Lerch, head of the Performance Test Group of the Portland Cement Association, contained much of specific application to the concrete pipe industry.

Mr. Lerch sketched the swift developments in heavy construction after the First World War, which led to the adoption in 1930, of a specification for high early strength portland cement. He showed how this was followed in 1941 with the adoption of specifications for five types of portland cement for various conditions of exposure, in addition to air entraining portland cement. He showed how large water supply and irrigation projects, especially in the western states, made it necessary to place concrete pipe lines in sulphate soils and compelled the development of sulphate—resistant concrete.

Mr. Lerch listed the five types of portland cement and their special uses described in A.S.T.M. specifications as follows:

Type I: For use in general concrete construction when the special properties specified for Types II, III, IV, and V are not required.

Type II: For use in general concrete construction exposed to moderate sulphate action, or where moderate heat of hydration is required.

Type III: For use when high early strength is required.

Type IV: For use when a low heat of hydration is required.

Type V: For use when high sulphate resistance is required.

Mr. Lerch explained that the special properties required for the various conditions of use are provided by certain chemical limitations in the cements. He referred to a new procedure for determining the maximum gypsum content of portland cement, adopted by the A.S.T.M. in 1953.

"Concrete pipe are used in many different ways and under various conditions of exposure," Mr. Lerch said. "In general, the selection of the type of cement to be used in the production of concrete pipe will depend on the requirements for strength, permeability and sulphate resistance.

"Type I or Type III cement should be suitable for use in all concrete pipe production where sulphate resistance is not involved. The quality of the concrete mixture determines the strength and permeability of the product. Concretes of low water-cement ratio provide high strength and a high degree of impermeability. Cement content and water-cement ratio are usually closely related. A low water-cement ratio is obtained with rich mixtures. Proper grading of the aggregates is a further aid in obtaining a low water-cement ratio. Good quality concrete made with Type I cement followed by proper curing will produce concrete pipe of high strength and low permeability. It may be desirable to use Type III cement under certain conditions of production to reduce the curing period and provide more rapid delivery of the finished product.

"When a requirement for sulphate resistance is involved," Mr. Lerch said, "Type II or Type V cement and good quality concrete should be used. The A.S.T.M. Specification C150 recommends the use of Type II cement for concrete exposed to moderate sulphate action and Type V cement where high sulphate resistance is required. The use of good quality concrete is just as essential as the use of Type II or Type V cement. Poor quality concrete of high water-cement ratio, even though made with sulphate resistant cement will not withstand the aggressive action of sulphate waters.

"The rate at which the strength of concrete increases varies somewhat with the type of portland cement used," Mr. Lerch said. "Concretes made with Type II and Type V cements have lower strengths at early age than comparable concretes made with Type I cement."

Mr. Lerch pointed out that the requirements for sulphate-resistant



Stanton Walker, National Sand and Gravel Association, Washington, D. C., blinked his eyes when the picture was "shot"



William Lerch, head of the Performance Test Group, Portland Cement Association, Chicago

concrete may come from three quite different conditions. He described these conditions as follows:

(1) When the concrete pipe are placed in soils containing sulphates and the exterior surface of the pipes are exposed to sulphate waters.

(2) When the concrete pipe are to carry industrial wastes, mine waters or other waters that may contain sulphates.

(3) When sewer pipes are placed under conditions that facilitate the generation of hydrogen sulphide and its subsequent oxidation to sulphates.

"Sulphate waters are sometimes acidic," Mr. Lerch said. "The Type II and Type V cements are not more resistant to acid than Type I cement. Where acid conditions are encountered, provisions should be made to neutralize the acid, to prevent its formation in the case of sewage or to provide a protective coating for the concrete."

Air-Entrained Concrete

Mr. Lerch said it has been found that air-entrained concrete has many beneficial properties in addition to those for which it was developed. In addition to improved resistance to freezing and thawing and resistance to surface scaling from use of salts for ice removal, he said air-entrained concrete improves workability, reduces segregation and bleeding tendency, has lower permeability and an increased resistance to the aggressive action of sulphate waters.

"Air-entrained concrete is not suitable for use in the production of centrifugal spun pipe," Mr. Lerch warned. "Air entrainment increases the formation of froth in that type of pipe production. The use of air-entrained concrete should have considerable merit in concrete pipe produced by other processes."

Newly discovered scientific facts about the physical and chemical reac-

tions occurring during the hydration of cement were disclosed to the pipe manufacturers by Hubert Woods, director of research of the Portland Cement Association. Mr. Woods, who was the featured speaker on the program, September 10, discussed "Cement Hydration in Relation to the Curing of Concrete." Some of the new knowledge about the size of cement particles and their reactions during curing, Mr. Wood said, was obtained very recently through the use of an electron microscope.

Facts About Hydration

"I want first to talk about what happens when a single grain of cement reacts with water, and to do this it will be convenient to imagine either that we enlarge this grain perhaps 25,000 times, or that we shrink by the same factor, to see what goes on."

Using a blackboard, Mr. Woods drew a circle as a convenient way to represent a grain of cement, which he explained is not round but is actually rough and angular. He then drew another circle around the first one to represent water surrounding the cement grain.

"Immediately something happens," he said. "Some of the cement grain dissolves in the water, in somewhat the same way as a grain of sugar or salt would. There is, however, a big difference. The cement grain dissolves more slowly and to a much lesser extent than sugar or salt. Only a little can go into solution at a time. Now here comes another big difference. Once the sugar or salt goes into solution, it will stay in solution unless we interfere in some way. In the case of the cement grain, the small amount which is in solution at any time does not stay in solution. It reacts with the water and then deposits or precipitates as a new solid substance which we call cement gel.

"I would like to make it clear," Mr. Woods said, "that the term gel does not mean jelly. Gel refers to a substance made up of smaller particles in a certain size range, and does not mean soft or jelly-like. Actually, the cement gel is very hard, and it is this gel that is responsible for the bonding together of aggregates and for the strength of concrete. The gel so formed is quite different from the original cement grains. It has a different chemical composition, different density, different optical properties, and different mechanical properties. The reaction between the cement grain and the water continues, as I have indicated, by solution, and deposition of gel, until something occurs to put an end to it. This might be complete hydration of the cement grain, but usually not.

"The circumstances which limit the hydration of cement, and put an end to the formation of more gel, are of importance with respect to the practical problems of curing. In the first place, the gel cannot be formed except from a water solution of cement grains. Another way of saying the same thing is that the gel is always formed in water-filled space. If for any reason water-filled spaces cease to exist, hydration stops."

Mr. Woods explained that for complete hydration, the gel occupies about 2.2 times the original volume of the cement grains. He said he referred to absolute volume of both the cement and the gel. In absolute volume he said a sack of cement is less than 0.5 cu. ft. instead of 1 cu. ft. The rest is air, he said. Because of these facts, he explained, for complete hydration there must be an original water-cement ratio of at least 0.40 even though the cement can eventually combine with only 0.23 of its weight of water.

"If the concrete is allowed to dry out," Mr. Woods said, "so that the total water content becomes less than 0.40, not all the cement can become hydrated no matter how long we wait. It is obvious then, that the function of curing is to maintain enough water-filled space in the concrete so that hydration can go on to the desired degree."

The speaker then took up the question as to why, if completely hydrated cement combines with only 23 percent of its weight of water, a minimum of 40 percent is required to bring it about. Going into considerable detail as to the size and nature of the gel particles, he said they are almost unbelievably small, so small that it takes 2000 of them side by side to span a single cement grain. Complete hydration of the average cement grain, he said, would give rise to about 8,000 million gel particles.

"Very recently we have actually been able to photograph some of these particles, using an electron microscope," Mr. Woods said. "They are about the size we had expected but we had two surprises. The first was that all these particles are very nearly round and the second was that they were all nearly the same size. The largest was only about twice the size of the smallest, whereas the original cement grains vary over a size range of more than 30 to 1."



Hubert Woods, director of research, Portland Cement Association, Chicago, Ill.

Mr. Woods explained that although the gel particles are in contact with each other there are some water-filled spaces between them, including what are called capillary cavities. The latter, he said, are remnants of the much larger water-filled spaces which existed between the cement grains. New gel can form, he said, only in the capillary cavities and not in the smaller spaces between the rounded gel particles already formed, these gel pores being too small to permit more gel to form in them.

When the water saturated cement paste is put in an atmosphere where the relative humidity is 80 percent, Mr. Woods said, the paste starts to dry out, water first coming from the capillary cavities. The rate of hydration continues to fall, he said, along with the relative humidity inside the cement paste. Obviously no gel can form in spaces which have been emptied of water, he pointed out.

Mr. Woods explained that he had used 80 percent relative humidity as an example, "because when the paste is dried to that humidity, hydration virtually ceases. At that degree of dryness, practically all of the capillary cavities have been emptied of the water they once held. I hope I have not given you the impression that when this happens, there is no further water left. This is certainly not the case, because there remains a considerable quantity of water in the smaller spaces around the gel particles (in the gel pores) and of course there is chemically combined water in the gel particles themselves.

"Perhaps it may now be clearer," he said, "why it is that in order for cement hydration to proceed, we must have in the concrete a considerably larger quantity of water than can actually combine chemically with the cement. Experiments have shown that water to the extent of about 23 percent by weight can combine with cement, but in order to permit this amount of hydration, it is necessary to provide a very minimum of 40 percent."

Mr. Woods said that in order to make clear the basic principles involved in curing concrete he had discussed the matter as if complete hydration of the cement is desirable. "Actually, complete hydration of cement is neither necessary nor desirable," he said. "The degree of hydration is not directly related to strength or other desirable properties of concrete. For example, the strongest cement product I've heard of, was made from cement and only 8 percent water, and molded under pressure. A compressive strength of 40,000 p.s.i. was obtained. Obviously only a very little of the cement could have been hydrated. It is well known, of course, that strength and other desirable properties of concrete are enhanced when the water-cement ratio is low."

If the situation seems somewhat paradoxical, Mr. Woods said it should be remembered that the true objective is to so arrange matters that the original water-filled spaces in concrete are eventually filled to the maximum possible extent with cement gel. "If the original water-cement ratio is very high," Mr. Woods continued, "then there will be so much water-filled space that there would not be enough cement to fill all that space, even if all the cement becomes hydrated. In such cases, the final concrete may contain a great many large capillary cavities which weaken the concrete and which could result in low durability. In any event, curing will be desirable so as to reduce these capillary cavities to the maximum extent.

"If the original water-cement ratio is low, then it is quite possible for the original water-filled spaces to become virtually filled with gel, without having to hydrate all the cement."

Mr. Woods summed up his talk by emphasizing the fact that the object of curing is to permit hydration to continue to the desired degree. "This desired degree of hydration," he said, "need not be complete hydration of the cement. It is more closely related to the degree to which the original water-filled space has become filled with cement gel. In any event, reaction with all the water is impossible.

"Finally, a word about concrete pipe. I am not intimately familiar with all the various procedures used in your industry, nor with all its problems. I understand, however, that a large amount of pipe is made with concrete of very low water-cement ratio. If such concrete is cured at normal temperatures, the principles which I have discussed must apply, and, consequently, we would expect that only a part of the cement ever becomes hydrated, no matter how long the curing. High pressure steam curing *may* bring about a much larger degree of hydration, although we are not sure of this. The fact is that the chemistry and physics of high pressure steam curing are not well known. The practical results are well known. It is for the future to explain these results, and perhaps to improve them."



Geo. W. Hoffman, Concrete Pipe Machinery Co., one of the speakers



Members of morning panel, left to right: Peter Van Kuran, American Pipe & Construction Co., South Gate, Calif.; Edward F. Donnelly, Southern Block & Pipe Corp., Norfolk, Va.; Paul L. Osweiler, Price Bros. Co., Dayton, Ohio; W. E. Corbett, moderator, Corbett Concrete Pipe Co. Inc., Milford, Mass.; Hal W. Huddleston, Choctaw, Inc., Memphis, Tenn.; Walden Wren, Universal Concrete Pipe Co., Columbus, Ohio, and Albert von K. Gary, Augusta Concrete Products Co., Augusta, Ga.

Second Day Program

The second day's program, Friday, September 11, was devoted to various developments in pipe plant equipment and manufacturing methods.

Joseph A. Robinson, of the Viber Co., Burbank, Calif., used slide films and colored motion pictures to illustrate his talk on "Operation and Maintenance of External Vibrators in Pipe Manufacture." He declared that there are many advantages of external vibration.

"External vibration," Mr. Robinson said, "helps make pipe faster and with less labor. Form vibration, "he said, "produces an excellent finished surface inside and out as well as a uniform, high strength section free of rock pockets or honeycomb. External vibration is faster," he declared, "because controlled vibration from the bottom up permits maximum speed in placing concrete in the form. It involves less labor," he said, "because once the vibrator is attached to the form it does not have to be moved."

George W. Hoffman, of the Concrete Pipe Machinery Co., told of a new method of vibration which he said is intended especially for compacting dry concrete. His method of pipe manufacture is described in detail on another page of this issue.

T. S. Rowe, president of the Hamilton Kent Manufacturing Co., Kent, Ohio, spoke on "Rubber Gaskets and Their Use." He described the types, uses and methods of installing rubber gaskets on concrete pipe lines. "Product improvement," Mr. Rowe said, "is responsible for the vast growth of the concrete pipe industry and the rapid acceptance of concrete pipe."

Harold L. Vines, vice-president of the Noble Co., Oakland, Calif., opened the Friday afternoon session with a talk on "Weigh Batching in the Manufacture of Concrete Pipe." He said that weigh batching began to be important after acceptance of the water-cement ratio theory. He declared that weigh batching is necessary for control of quality and predicted that weighing of mixing water as well as cement and aggregates will become standard practice. He also expressed the belief that batch recording may be required in the future on certain types of work.

"A permanent record of the various ingredients going into concrete pipe could be of great value in the future," Mr. Vines said. The U.S. Engineer Corps, he said, is now testing recorders intended for this purpose.

Mr. Vines emphasized the importance of having a master plan to be followed in setting up a new pipe plant. He said provision of adequate facilities for handling traffic is a vital necessity. Driveways, he said, should be laid out for both incoming and



Edward M. Brickett, Hume Pipe of New England, Inc., Swampscott, Mass.



Members of afternoon panel, left to right: Tom A. Thomas, Jr., Thomas Concrete Pipe Co., Ada, Okla.; Carl Johnsen, Nelsen Concrete Culvert Co., Inc., Champaign, Ill.; H. H. Dickehut, Texas Industries, Inc., Corpus Christi, Texas; Louis F. Dolch, moderator, Dolch Concrete Pipe Co., Dallas, Texas; Henry Weigand, Universal Concrete Pipe Co., Azusa, Calif.; R. M. Jefferies, Jefferies & Sons, Ltd., Calgary, Alb., Can.; and J. Vernon Kyle, Atlanta Concrete Pipe Corp., Atlanta, Ga.

outgoing traffic. Traffic goes hand in hand with storage problems, he said. Too many yards, he declared, are so poorly laid out that operating costs are unnecessarily high. Many plants are set up with too little storage space. Listing the various factors which should be taken into consideration in a master plan, Mr. Vines declared conveyor capacity to be of first importance.

W. O. Everling, director of research of the American Steel and Wire Division of the United States Steel Corp., at Cleveland, Ohio, described some late developments in prestressing wire for use in concrete construction. He declared that too little is known about the behavior of stressed wire under heat. There is little to fear, he said, at temperatures up to 700 deg.

In introducing a motion picture on "Fork Truck Handling of Concrete Products," Ernest Jones of the Tracto Lift Co., Kansas City, Mo., said the value of material handling equipment had increased 55 times from 1941 to 1951.

James J. Beach, of the Silent Hoist & Crane Co., Brooklyn, N.Y., used colored pictures in describing the development of a new type of fork truck and other mobile equipment designed for use in pipe plants.

The Friday session closed with the showing of a colored motion picture on the manufacture of concrete pipe in the plant of the Hancock Concrete Products Co., at Hancock, Minn.

Panel Discussions

Forty-nine questions were presented to the panel members in the discussion of various manufacturing problems which occupied the entire time of the third day's program, Saturday, September 12. The questions covered the widest possible range and included many relating to curing methods, admixtures, "who makes what" and "where can I buy it?" The nature of many of the questions was such that off the cuff answers were impossible. However, all the questions stimulated healthy discussion by pipe men on the floor as well as those on the two panels.

W. E. Corbett, of the Corbett Concrete Pipe Co., Milford, Mass., was moderator on the morning panel. Other panel members for the morning session were Peter Van Kuran, American Pipe & Construction Co., Los Angeles, Calif.; E. F. Donnelly, Southern Block & Pipe Corp., Norfolk, Va.; Paul Osweiler, Price Bros., Dayton, Ohio; Hal W. Huddleston, Choctaw, Inc., Memphis, Tenn.; Walden Wren, Universal Concrete Pipe Co., Columbus, Ohio, and Albert von K. Gary, Augusta, Ga.

Louis Dolch, of the Dolch Concrete Pipe Co., Dallas, Texas, was moderator of the afternoon panel. Panel members were: Tom A. Thomas, of the Thomas Concrete Pipe Co., Ada, Okla.; Carl Johnson, Nelsen Concrete Culvert Co., Champaign, Ill.; J. V. Kyle, Atlanta Concrete Pipe Co., Atlanta, Ga.; Henry Weigand, Universal Concrete Pipe Co., Azusa, Calif.; H. H. Dickehut, Texas Industries, Inc., Corpus Christi, Texas and R. C. Jefferies, Jefferies and Son, East Calgary, Alberta, Canada.

Nebraska Prize Awards

(Continued from page 193)

large living room and a large, open multi-purpose area. Comment of the jury noted that it employed carefully considered new uses for concrete masonry; that it shows a good basic relationship between rooms; that it is a direct and simple plan with an open quality; that it is advantageously oriented to the lot; and that its easily-supervised, multi-purpose area is unusual in a house of the size under consideration.

Exterior walls in the winning first place design are standard 8-in. concrete block with alternate courses of concrete brick, painted. The floor is of concrete soffit tile with a 2-in. concrete slab. The masonry screen enclosing the porch is of concrete pilaster block and concrete brick. Interior is furred, with plaster or wood finish, or exposed.

Brick Plant

Union Sand and Supply Corp., Painesville, Ohio, has started production of a large-size, lightweight brick, tradenamed "Unilite." The brick, which are one and a half times the size of conventional brick, are made of portland cement and a lightweight expanded aggregate. Color of the brick is a light gray. Use of the brick is said to reduce builders' costs, substantially.

Concrete Mix Design

(Continued from page 198)

free moisture in the materials.

As was the case with original field mixes of regular concrete, the new air entrained concrete mix must be processed in the field and checked for slump, workability, yield, air content and strength. If changes are necessary, the design routines should be repeated and adjustments made until we get a mix that fills the bill.

At all ready-mixed concrete operations, mix designs should be such as to assure workable, durable, high strength concrete. The matter of mix design is of prime concern to all ready mixed producers. They and their key employes should know the fundamentals of concrete proportioning. Such information adds greatly to the "Know-how and Knowwhy." A proper mix design is a necessary prerequisite to the production of quality concrete.

Named "Permalite" Franchisee

Precast Slab and Tile Co., St. Louis, Mo., producer of precast perlite concrete products, has been appointed an excluisve "Permalite" franchisee of Great Lakes Carbon Corp., as recently announced jointly by D. Loring Marlett, assistant general manager of the Perlite Division of Great Lakes Carbon Corp., and J. John Brouk, president, Precast Slab and Tile Co.

Announcement was also made of the appointment of J. J. Brouk and Co., St. Louis, Mo., as the national sales agency for Great Lakes Carbon Corp. The Brouk sales organization will service present Permalite franchisees and independent ore customers located in its sales territory, as well as develop and promote new markets. J. J. Brouk, president of Precast Slab and Tile Co., is also president of J. J. Brouk and Co.

Precast Slab and Tile Co. is reportedly the oldest commercial producer of expanded perlite east of the Rocky Mountains. In addition to expanded perlite aggregate for plaster and concrete, the company also produces precast perlite concrete, lightweight roof slabs, marketed under the trade name "Castlite," with a plant capacity of over 25,000 sq. ft. per day. The company also maintains a large department for installation in the field of these and other types of roof decks, including both precast and poured-in-place roof decks. The company employs approximately 200 men.

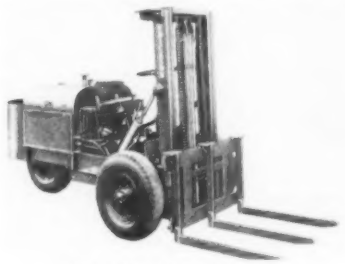
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Stanwood Ready Mix Co., Stanwood, Iowa, formerly owned by Harry Hoisington, Olin, Iowa, has been sold to Mr. and Mrs. H. L. Morehead and son, H. L. Morehead, Jr., also owners of Morehead Construction Co., Cedar Rapids, Iowa. The Stanwood plant will be under the management of Orell Van Horn.

NEW MACHINERY

Fork Truck

ERICKSON POWER LIFT TRUCKS, INC., 1421 Marshal St. N.E., Minneapolis 13, Minn., has introduced Models F-4R and F-6R power lift trucks with 4000-lb. and 6000-lb. fork lift capacities. The models are designed

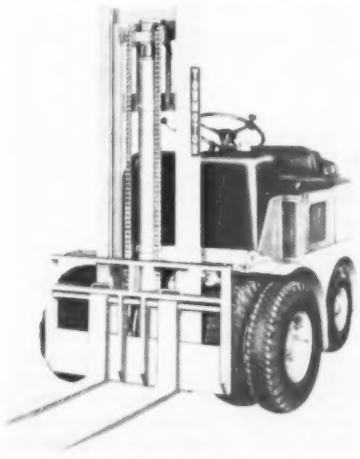


Fork lift truck has 108-in. lift

for both outdoor and indoor use where a smaller, compact truck is required. A ballast box at the back of the truck over the rear steering wheel permits varying the balance weight for each individual job. Pneumatic tires and 12-in. center underclearance provide traction on rough or soft ground, and allows clearance of high sills, tops of steer ramps, etc. An International U2A engine, heavy-duty, 11-in. clutch and dual transmission provide four speeds forward and four reverse, up to 25 m.p.h. The standard lift is 108 in.; lowered height, 80 in. Various type forks are available for specific jobs, as well as other attachments such as a fork sideshifter, hydraulic scoop, etc.

Lift Truck

TOWMOTOR CORP., 1226 East 152nd St., Cleveland 10, Ohio, has added dual-drive wheels as optional equipment to Models 480-P and LT-60 pneumatic-tired lift trucks. The dual drive wheels are mounted on the drive axle as replacements for standard single wheels. More tread surface for load handling over soft ground, and greater stability for trucks with extra-high lifts are two advantages of operation. Installation of the wheels does not decrease the capacities of the lift trucks.



Fork lift truck with dual-drive wheels

Heavy-Duty Air Hose

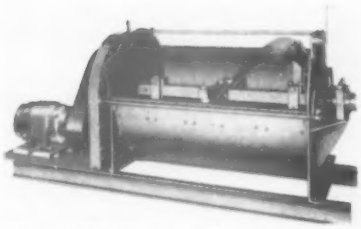
B. F. GOODRICH CO., Akron, Ohio, has brought out a heavy-duty air hose for working pressures up to 400 p.s.i. Designated the "Commander," it is reinforced with a single braid of high-tensile steel wire, and has an oil-resistant tube for oiling tools through the hose. It is designed for use in quarries, construction projects, mines, and general industrial use where rugged service is required. It is available in ½-, ¾- and 1-in. sizes.

Masonry Paint

MARTIN-SENOUR CO., 2520 S. Quarry, Chicago, Ill., has developed "Colorsol," a masonry paint, in 144 colors for stucco, brick, concrete and concrete block. The paint is alkali-resistant and is said to retain its color under extreme weather conditions and resist mildew and fungus. It can be brushed or sprayed as ordinary house paint and, depending on the nature of the surface, will cover from 250 to 500 sq. ft. per gal.

Batch Mixers

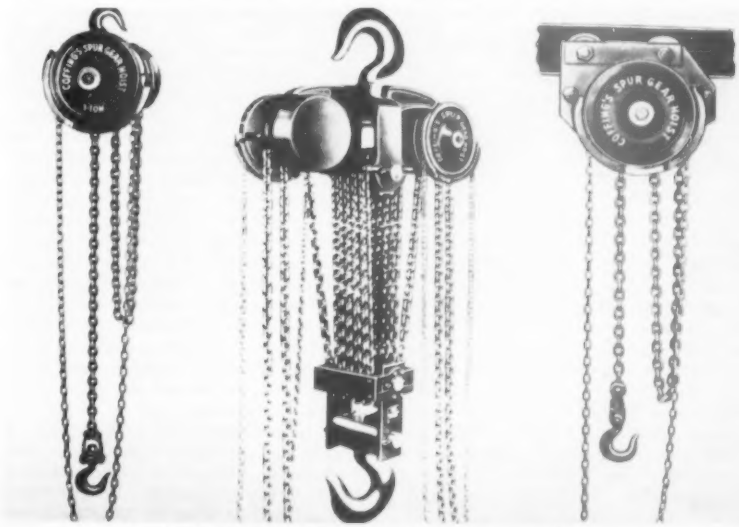
BERGEN MACHINE & TOOL CO., INC., 189 Franklin Ave., Nutley, N. J., has announced the company is now producing a 50-cu. ft. capacity batch mixer. Its features include a dust-proof hub and plate to prevent aggregate leakage, roller bearings on all shafts, a 5-in. square main shaft, a reversible 130-tooth main gear, Ni-Hard blades and liners and a 30-hp. motor. A choice of either right or left hand drives is available.



Concrete batch mixer of 50-cu. ft. capacity

Spur Gear Hoists

COFFING HOIST CO., Danville, Ill., has added 55 models and sizes of spur gear hoists to its line. Included among the new units are 15 sizes of single- and multiple-chain spur gear hoists with capacities ranging from ¼ to 25 tons. For specialized applications there are plain and geared army-type hoists, ¼ to 10 tons; low headroom hoists, 1½ to 24 tons; clevis connected hoists, ¼ to 10 tons; and extended handwheel hoists from ¼ to 3 tons. In the army and low headroom models, the hoist is an integral part of the trolley, plain or geared, to permit working where low headroom prevents the use of standard units. Clevis-connected hoists are used where headroom prevents the standard hoist and trolley hook-up. The top hook is removed and the hoist is suspended from a specially designed trolley clevis, thus saving from 3- to 16-in. headroom, depending on the hoist size. Extended handwheel hoists are provided for handling hot materials, large, bulky loads, or where there is danger of scratching highly polished surfaces with the hand chain. The handwheel extension is a maximum of 10 ft.



Single-chain, multiple-chain and army-type trolley hoists

CINDER BLOCK MEETING

Discusses Aggregate Shortage

ATLANTIC CITY, N. J., was host to the annual meeting of The National Cinder Concrete Products Association at the Claridge Hotel on August 17-19. The meeting was well attended by both producers of cinder concrete masonry units and machinery representatives.

The morning session, with Henry H. Longenecker presiding, opened with a discussion of the future cinder supply. M. J. Shimko, Anthracite Cinders, Hazelton, Penn., told about his production facilities providing for shipment of four to five cars daily of minus ⅜-in. cinders. He said 1,600,000 tons were available from two sources with a third source on the horizon. George N. Malcom, D. L. & W. Coal Co., outlined his company's activities in the current production of cinders. Among those who spoke briefly on the cinder supply subject were Wm. G. Bower, H. Hessey Miller Co. and others. One speaker indicated that there were between 40 and 60 operators producing cinders for sale.

One gathered the impression that the long talked of shortage of cinders was not as serious as it might appear. This, in a measure, could be attributed to more current production and better processing techniques being applied to old banks that were formerly considered worthless. Other lightweight aggregates, both natural and artificial, were taking some of the load, and on this theme Samuel Caprari, president, Virginia Aggregates Co., and the Lake City Lightweight Aggregates Corp. described the operations at Appalachia, Va., and at Lake City, Tenn. The former is a new plant designed to process "Red Dog," the name applied to residues that remain from burned out waste coal dumps or culm piles. The product is light in weight, and is finding a widening use in concrete masonry work in his area. The Lake City operation uses specially designed Vulcan rotary kilns to produce a material similar to Haydite.

"Dryer" Kilns

Sam Paturzo, president of the National Concrete Masonry Association, described the dryer kilns that he used to meet the Corps of Engineers, U.S. Army moisture specifications in Baltimore. As he wanted to meet those specifications regardless of weather conditions, a dryer was built to do the job. Block two to three weeks old were placed in the dryer and subjected to a circulating hot air treatment. After drying, the block had 1½ to 4 percent of total moisture which is far below the 30 percent specified. These kilns are 50 ft. long and 6 ft. between walls. Mr. Paturzo said it cost about 2 cents per 8-in. unit to do the job and that he got a premium for the final product. He also mentioned a new army specification whereby the FeO (iron oxide) must be less than 1.2 milligrams per 200 grams of cinders and this might be a difficult specification to meet.

Other subjects in the round table discussion related to the lack of a friability test for cinders; freight rates on cinders; truck-haulage of cinders vs. rail haulage; pumice coming into the Atlantic Seaboard from Greece at a reported selling price of $5.10 per ton F.O.B. the docks in loads of 22,000 tons, and the expansion properties of pumice; artificial lightweight aggregates derived from slag; and the action of mortars when used with dry block, whereby the water is sucked out of the mortar with a resulting hair crack. It was indicated that the subject of "water-from-mortar-to-block" and the "water-in-block-to-mortar" effects were being studied currently by the engineering staffs of N.C.M.A. It was indicated that the data on drying reviewed by Mr. Paturzo will soon be published by N.C.M.A.

High Pressure Curing

During the afternoon session of the first day, Fred W. Reinhold, Anchor Concrete Products, Inc., Buffalo, N.Y., told about his company's decision to install high pressure steam curing kilns for curing masonry units. He is installing four autoclaves at this time with four additional projected. The kilns will be 10 ft. dia. and 89 ft. long. A 300-hp. boiler will supply the steam, and fuel consumption is estimated at 6 lb. of coal per hour per autoclave. He plans a 2-cycle per 20-hr. operation, and on such a production schedule estimates that operating costs will be in line with former figures. Installation cost for the eight autoclaves is in the $425,000 range; the boiler and the first four kilns will cost an estimated quarter of a million dollars. His straight racks will hold 108 block. He will use the Blaw-Knox door. Mr. Reinhold said that tests showed that high pressure steam cured block had 50 to 60 percent less shrinkage than high temperature cured units and that he felt that this installation was the step in the right direction to produce a better block. Mr. Reinhold has three Bessers in his plant; two in use, with the third as a stand-by unit.

E. H. Brooke, National Brick & Supply Co., Washington, D.C., described his company's installation of high pressure steam curing. Mr. Brooke will eventually have six autoclaves; four in use now with two more being installed. The kilns are 8-ft. dia. and 115 ft. long with five supporting saddles. Steel racks were redesigned to hold 72 block. He has two Besser Vibropacs in use; three Towmotors and two platform Erickson trucks. The boiler is a 250-hp. unit. Blaw-Knox quick-opening doors are used. He estimates installation costs at $250,000.



H. H. Longenecker

M. W. Ferguson, Pre-Shrunk Masonry Sales Corp., Roanoke, Va., told of his experience with high pressure steam curing. Mr. Ferguson has been pioneering this field for years, and at his Roanoke operation has had autoclaves in use for upwards of 12 years. He said one could not expect to save portland cement by autoclaving, but that expansion and contraction would be reduced from 50 to 60 percent. He uses a 40 percent substitution of silica flour for portland cement. As the silica costs $12 per ton and the portland cement about $18, a saving is effected. He indicated that the rate of reduction of shrinkage was related to the cross section of the block. Thin blocks could be cured in 6 hr. with the solid requiring 12 hr. He also said that a small amount of lime added to the mix gave better workability. The lime reacted with the silica with some of the reaction taking place before additional CaO was released by the portland cement in the setting reactions. In reply to a question posed by A. G. Watt, Lehigh Cement Co., Allentown, Penn., Mr. Ferguson said that 85 percent of the movement of a block took place within 15 min. after it had been wetted and that was due to temperature changes. He indicated that eventually the traverse movement of a concrete masonry unit would be the governing test and at that time the compression test would be relegated to one of minor importance. He also felt that cement mortars might provide a "no-slip" condition in a wall and account for pulling the wall apart. He said, long periods of treatment in an autoclave at too high a temperature (230 deg. F.)

drives off water of crystallization in the concrete, and this may defeat the advantages of high pressure steam curing as it causes excessive expansion on re-wetting. Mr. Ferguson said that some of his kilns were over 50 years old having seen service in the sand-lime brick industry previously. He felt that the life of a kiln was at least 20 years. The internal revenue department allowed a 12-year write-off for autoclaves, he said. Mr. Ferguson said that the cost of autoclaved block was less than conventional curing if the latter would throw out all the "hooey." He said he operated his kilns at 140 p.s.i. Mr. Reinhold said he planned to operate his at 155 p.s.i. Mr. Ferguson said he made block of different quality and had a block to match every pocket book. Mr. Brooke said he sold 50 percent of his block to dealers, but may do his own merchandising with the high pressure cured units. Several other producers indicated their interest in high pressure steam curing. Jack Freedman, Massachusetts Cement Block Co., Medford, Mass., asked for information on types of doors used on the autoclaves. Mr. Brooke said that some doors use a gasket and bolts and these are a problem. He further explained that the Jackson-Church door was a 'lug-against-lug' door. The Blaw-Knox door has a contracting ring in the head. Mr. Reinhold said that the Harris (Ted Harris) closure is a stationary door with a rotating ring. He said it was made in Buffalo.

Ralph C. Condo, James Condo & Son, Somerville, N. J., felt that expansion joints, or control joints were adequate to take care of expansion and contraction problems pointing out that everything in nature expanded and contracted. The meeting ended with a discussion as to the relative cost of such expansion joints as compared to high pressure steam curing. Mr. Ferguson contended that such joints cost 2 to 3 cents per block.

The second day session opened with a talk by W. J. Shore, Shore Engineering, New York City, N.Y., who gave some detailed information relating to the construction and use of high pressure curing units. Mr. Shore acted as a consultant on the kilns installed by Mr. Brooke. He called attention to some of the dangers of high pressure steam curing units but felt that automatic controls could eliminate most of them.

Block Unloaders

The second feature was a moving picture by John T. Fizzano, Fizzano Bros., Crum Lyne, Penn., showing the operation of the block unloading system developed by Bros. Mfg. Co., Minneapolis, Minn. The film showed the electro-lift unit that has a lifting capacity of 6000 lb. and the smaller unit called the "Magic Muscle" that handles from 6 to 10 block per lift. Mr. Fizzano said he had two of the larger unloaders at his plant near Philadelphia, and through their use had cut his hauling costs from 2 cents to one cent for the 12-mile or less hauls. The showing of the film brought on a round-table discussion of unloaders in general and interest was displayed in the "Slide-Off" types of unloaders, such as those made by Gar Wood, Anthony, the Adam Black unloader, and others, both the cable-controlled type and the simple slide-off type. Jack Freedman told briefly of their use of the Rehberger unloader.

Merchandising-Advertising

The balance of the day's session was devoted to merchandising with R. Loran Langsdale, advertising executive, Baltimore, Md., presiding. Mr. Langsdale stressed the importance of having some "gimmick" to which to tie an advertising campaign and pointed out that the high pressure steam curing systems being installed were an excellent subject to tie up in the advertising package. During the informal talks that followed, it was apparent that most of the producers felt that the days of the sellers' market was on the decline, and that more and better sales efforts must be made if the concrete masonry business is to carry on its high marketing quotas. Fred W. Reinhold told about his company's advertising program that included the hiring of an architectural consultant. He passed an advertising pamphlet to his listeners showing how concrete block could be used for atomic bomb defense. He stressed the sales efforts directed at architects and of their hunger for details. His company has discontinued radio and TV advertising as it was too costly. He has added three more salesmen to his staff bringing his total to eight. His yearly advertising budget is about $34,000 which represents about two percent of sales. His Flexicore, Stresterete and colored block sales have been satisfactory.

The morning session of the last day was devoted to merchandising, and to machinery representatives who had their turn at telling those gathered of what they had to offer. E. W. Dienhart, secretary, National Concrete Masonry Association, Chicago, Ill., reviewed the association's activities on the national level. He said there were 24 state and local associations affiliated with N.C.M.A. He felt that a 1 to 2 percent budget for advertising was nominal and that some larger companies went as high as 5 percent. Charles E. Alwine, Alwine Brick Co., New Oxford, Penn., said that his company was also a producer of clay bricks and that the clay group were spending far more for industry development that the concrete masonry group. He said his dues to the clay group were in the $5000 per year range on a production of about 24 million clay units. Others who told briefly of their advertising schedules were W. H. Parthmer, Sam Paturzo, Raymond Hastings, Harry H. Longenecker, Ralph C. Condo, George A. Malowney, and others. Mr. Malowney told of giving 300 block to each new contractor as a good-will gesture, and of his company's billboard advertising campaign that has helped sales.

Ralph Condo described his new concrete masonry plant in which he will use the Kent continuous mixer. By its use, he hopes to iron out some of the inequalities of other systems of batching. He indicated that at the next yearly meeting he would tell of the results he hopes to accomplish. P. M. Parks, Besser Mfg. Co., told of his company's plan to have a celebration at Alpena, Mich., next year to celebrate that company's 50th year in the concrete masonry field. George L. Oswalt, Oswalt Engineering Service Corp., Forest Park, Ill., spoke briefly of the services his organization had to offer and of developments in the Chicago area in which he said he was building a new plant. E. E. Meeker, M. and M. Engineering Corp., Indianapolis, Ind., described his company's development of electronic controls for Besser machines. He said that it was possible to make up to 1800 block per hour on the Besser V3-R with no speed-up required. Electronic feed control and better control of squeeze time were some of the factors that made this production possible.

The meeting closed with an informal vote being taken as to where the next meeting should be held. It was not a conclusive vote except in the sense that Atlantic City would not be the meeting place; possibly Buffalo, N.Y. Harry H. Longenecker, secretary of the National Cinder Concrete Products Association will, at a later date, conduct a poll by mail on the next meeting place.

Basement Booklet

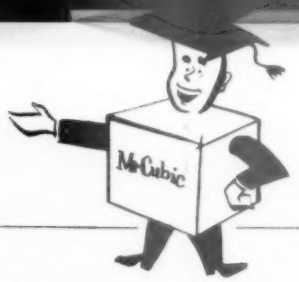
MEDUSA PORTLAND CEMENT CO., Cleveland, Ohio, recently issued a new revised edition of its basement book, "How to Make Basements Dry, Beautiful, and Livable." This 32-page, illustrated book, designed to assist Medusa paint dealers in advising customers what to do about decorating and damp-proofing basements, is said to be the most complete and practical book ever published on the subject of basement treatment.

In addition to decorating suggestions, the book tells what can be done about various degrees of basement dampness. Of particular interest is the section which shows that most basement dampness is caused by some fault in the drainage around the house, which should be corrected before water-proofing material is applied. Solutions for correcting these faults are described in detail. The book is available from Medusa Masonry Paints, Court Square Building, Baltimore 2, Md.

•

ZONOLITE CO., Chicago, Ill., recently announced plans to build a new processing plant in the Enoree, S. C., area.

on U.S.E.D. flood control project...





Challenge 6½ Mixer mount Cook Bros. "M- Truck is shown pe on Pacoima Project, Los An District Co Engineers, United Army. A. Teichert & Inc. is the contr

CHALLENGE TRUCK MIXERS

MEMBER N.R.M.C.A

Whatever the job—foundation, curb and gutter, highway, commercial or industrial building—Challenge Truck Mixers deliver concrete in exact accordance with your requirements—from regular concrete for ordinary pours to the most rigid city, county, state and federal specification concrete.

Compare Challenge with other mixers on any type of job. See first hand why Challenge is YOUR BEST MIXER BET!

Cook Bros. Equipment Co.
Please send name and address of my nearest Challenge Dealer.

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COMPANY _____

ADDRESS _____

CITY _____ STATE _____

COOK BROS. TRUCK EQUIPMENT

COOK BROS.
EQUIPMENT COMPANY

3334 San Fernando Road, Los Angeles 65, California
Telephone: CLeveland 6-3151

Exclusive National Distributors For CHALLENGE TRUCK MIXERS . . . Standard Of The Industry

Concrete Curing Method

DEVELOPMENT of a new method of curing concrete was recently announced by Reardon Industries, Inc., Cincinnati, Ohio. The new method consists of dusting a white dry powder, developed by Reardon, over the surface of the fresh concrete immediately after final tooling. It forms an elastic skin over the wet surface to prevent evaporation. In addition to curing concrete, the product, known as Duscure, is said to reflect the rays of the sun and thus reduce the surface temperature of concrete in hot weather.

Acid-Resistant Pipe

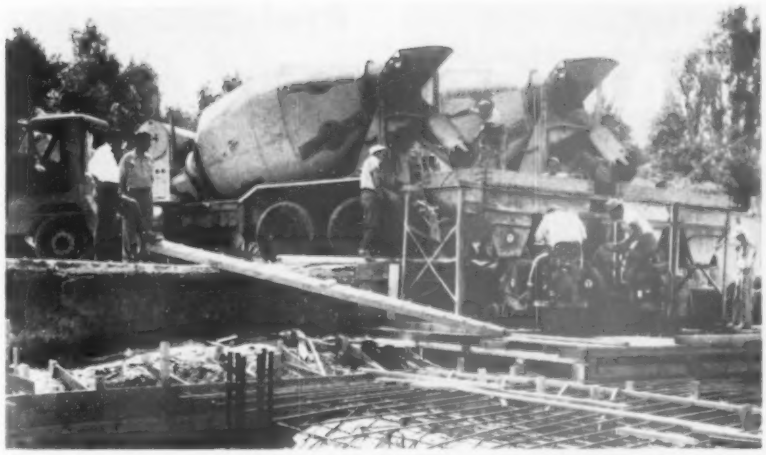
UNIVERSAL CONCRETE PIPE Co., Columbus, Ohio, recently supplied clay-lined, reinforced concrete pipe as a pressure-conduit to handle acid effluents from the paper plant of Newsprint Co. at Coosa Pines, Ala. According to an engineer for the paper company, the previously installed discharge line, made of concrete pipe with the inner surface coated with a bituminous compound, had disintegrated under the corrosive action of the waste pulp which had a pH rating of from 2.5 to 3.0.

After considerable study and investigation, the paper company decided upon 8-ft. lengths of 42-in. reinforced concrete culvert pipe, lined with 1.25-in. clay plate, for the 888-ft. pipe-replacement project. The pipe were produced at Universal Concrete Pipe Co.'s Decatur, Ala., plant.

Production of the pipe involved several engineering problems. The clay plates were secured to the core-mold by steel straps. Rubber strips were fastened between the plates to provide annular spaces 1.25 in. deep and from 0.25 to 0.50 in. wide. The outer mold was placed in position by use of steel reinforcement cage. The concrete was then poured and vibrated. After curing, the annular spaces were filled with a molten acid-proof, furane resinous compound and the groove end was coated with a plastic acid-proof compound.

Installation of the pipe was handled by Southern Amiesite Co. of Birmingham, Ala., and Moss-Thornton Co., Leeds, Ala. Construction features included embedment in foundation concrete and the use of a supplemental concrete collar 16 in. wide and 6 in. thick at pipe joints.

M. W. Loving, consulting engineer, Glenview, Ill., who inspected the pipe line, reported that the pipe line is not only unusual for the area, but the best work of this kind he has seen. He termed it "a splendid example of design and installation to solve the problem of acid-effluent removal."



Shown above are two of the eight 6½-cu. yd. Challenge truck mixers, mounted on Cook Bros. M-310 trucks, operated by Consolidated Rock Products Co., Los Angeles, Calif. The company recently delivered 742 cu. yd. of concrete during one 8-hr. shift. Distance of delivery was 2.4 mi. (in city traffic) from the batching plant to the pouring site

New Cavity Block

A NEW CAVITY AND REINFORCED WALL CONCRETE BUILDING BLOCK has been specified for use in a Connecticut school, as reported by Morris Lapidus, Brooklyn, N.Y., who has been issued a patent for the process.

Use of the block reportedly will build a cavity wall while laying up one wall and not two and can also accommodate vertical and horizontal reinforcing and grout in the space between the slabs to build a monolithic reinforced concrete wall within the block wall. The cavity block can be used as a foundation block as well as for walls above grade.

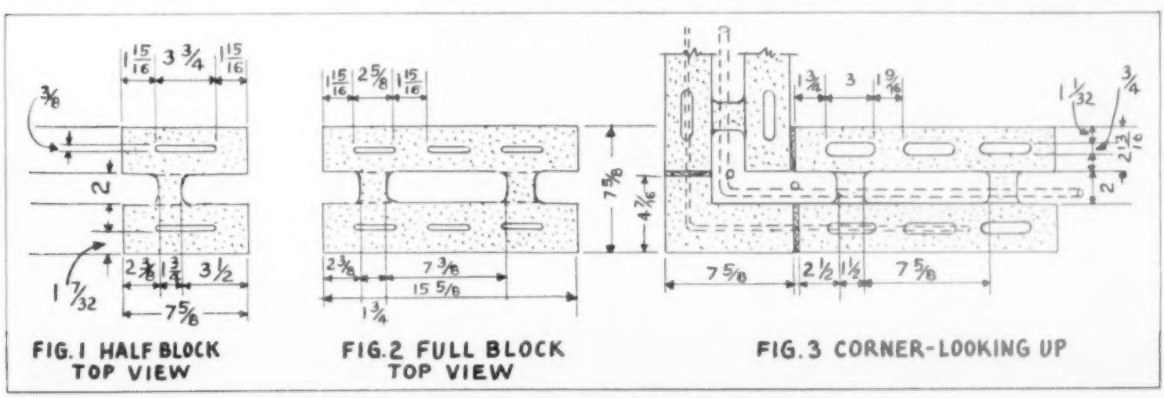
No special shapes are said to be required at window and door openings. The half block, the full block and the corner block, shown in Figs. 1, 2 and 3, are the only block required, the half and full block being used at the head and jambs and the corner block for sills and also stools in industrial buildings. It is claimed that the cost of the block is less than the cost of the two standard 4-in. block required to make a cavity wall and that the cost of laying the block is also less.

The bearing area of the solids at the base of one of the slabs of cavity block is 37 sq. in., compared with 27.6 sq. in. for standard block. It is also claimed that the integrally cast webs in each block and the mortar keys at the horizontal beds eliminate the need of metal ties—an additional saving in money and time.

The block for the Connecticut school and for other similar projects will be produced by Harold Levine, National Brick Corp., Long Island City, N.Y., on a Besser block machine.

●

A READY-MIXED CONCRETE PLANT is being established at Rock Rapids, Iowa, by Bob Olson of Rock Rapids.



Sketches showing details of cavity and reinforced wall concrete building block

Use Lime-Proof
MAPICO COLORS
to give your
CEMENT and MORTAR products
Permanent Beauty

These pure, high grade iron oxide pigments are unsurpassed for color, strength and brightness. And they'll help you to Keep Costs Down. Our representatives in principal cities are ready to cooperate. Write for full information.

YELLOWS • LIGHT REDS • DEEP REDS
BROWNS • BLACK

COLUMBIAN CARBON COMPANY
MAPICO COLOR DIVISION
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41 EAST 42nd STREET, NEW YORK, N. Y.

Professional Engineer In Industry

By E. BURWELL ILYUS*

● THIS ARTICLE has been prepared for professional engineers and engineering students, but it should be of timely interest to producers who are confronted with the problem of expanding plant facilities for which engineering counsel could be profitably used.

TODAY, AS NEVER BEFORE, a small increase in efficiency of operation can spell the difference between success and failure. This starts with the functional layout of the plant and is followed, naturally, by the purchase of suitable equipment and properly designed buildings, but this is not all. Ultimate utilization of manpower and equipment combined with socialogical procedures to complete the most efficient operation must be realized.

More and more, industry is turning to the professional engineer for assistance. Some organizations are large enough to employ professional engineers on full-time basis. Some set up an engineering department. However, there are a vast number of companies which are not large enough, or do not have enough work to warrant full-time employment of a professional engineer. This should not deter the smaller organizations, nor the larger ones which have an engineering department, from availing themselves of the services of the professional engineer, licensed by state governments to practice consulting engineering. These services may be obtained on the job basis or on the retaining fee basis.

You may ask, "What can an outsider do to help me when I have been operating my plant for years and know my equipment and product as I know myself?"

Regardless of the basis of employment, there are many ways in which the professional engineer can aid the company in realizing both increased efficiency and a handsome profit.

The competent professional engineer keeps abreast of the latest developments in methods and equipment. He does not lose the view of the forest because of the trees surrounding him. Because of this he is able to make surveys of the plant and to suggest profitable changes in operation, if he finds that necessary.

If additions to the plant or increased production are anticipated, the professional engineer can prepare the specifications for first, the required equipment; second, for the plant; and third, for the method of installation.

Too often smooth talking salesmen build up a beautiful picture around a piece of equipment which, without regard to efficiency or applicability, could be used for a certain operation. It happens to be the only piece of equipment he sells that could be used. He goes so far in his enthusiasm that he promises to provide, by the manufacturer, all engineering design free of charge. Only too late is it discovered that the wrong equipment was purchased because he was only looking for a sale. This results in a very expensive replacement with proper equipment if the first decision is not disastrous.

Had the experience of the professional engineer been utilized he would have specified the proper type of equipment—based on his varied experience in other plants on the same operation. When the bids are submitted he can assist in analyzing the specifications in the bids and advise on the best equipment to purchase for the highest efficiency of operation at the lowest unit cost.

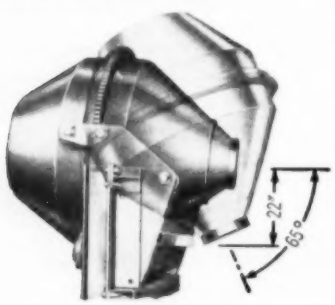
The specification of equipment and advice on purchase is only a small part of the professional engineer's usefulness. His services can be retained to design the foundations,

*Ilyus, Brown and Associates, Consulting Engineers, Roanoke, Va.

Burmeister
"TILT-UP" MIXER
CUTS PLANT HEIGHT AS MUCH AS 8 FEET

Burmeister's patented "tilt-up" feature—which reduces the mixer's headroom requirement—permits lower plant heights. This means easier crane loading, lower power costs, lower initial costs, less costly "conversions," increased portability, and better over-all control.





● In addition to reducing plant height, Burmeister's 3 cu. yd. "Tilt-Up" Mixer (left) provides a steeper 65° discharge from one spot, eliminates segregation of concrete and the danger of accidental discharge. It is simple to install, and has an integral hydraulic system—no compressor is required. Write for name of your nearest Burmeister Distributor, without obligation.

SEND FOR FREE CATALOG
Your copy of Burmeister's new illustrated Catalog is now available. Write today!



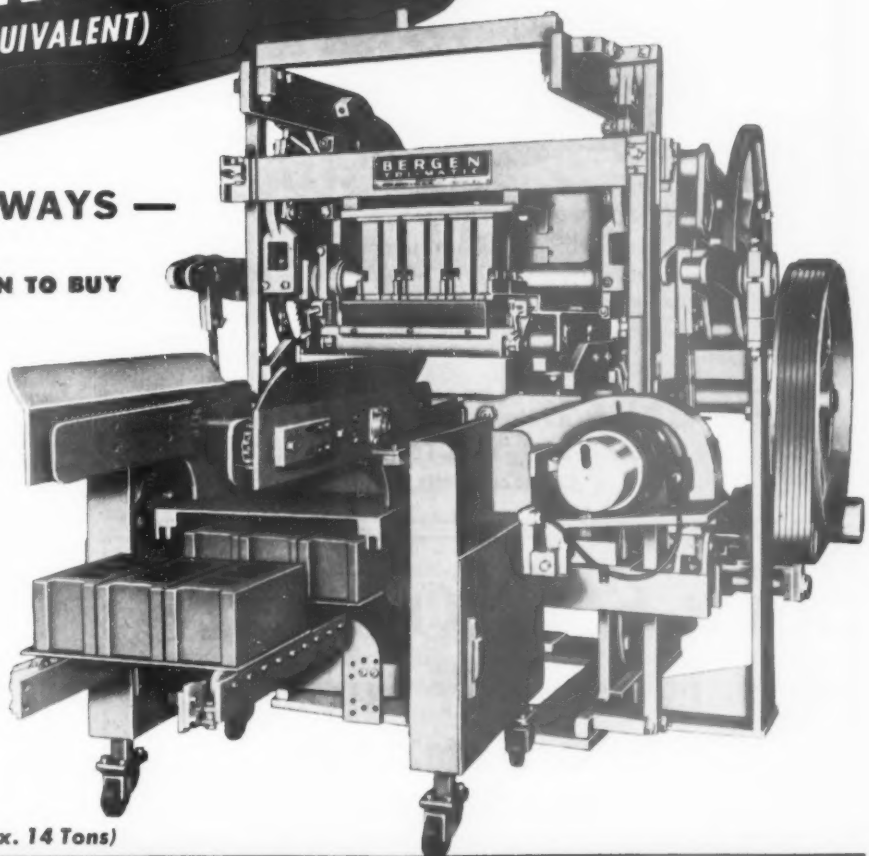
COMPLETE PLANTS FROM A SINGLE SOURCE
Burmeister
L. BURMEISTER CO., 4529 W. MITCHELL ST., MILWAUKEE 14, WISCONSIN

BERGEN TRI-MATIC

with **FRONT PALLET RETURN**

1,000 BLOCK PER HOUR

(8" EQUIVALENT)



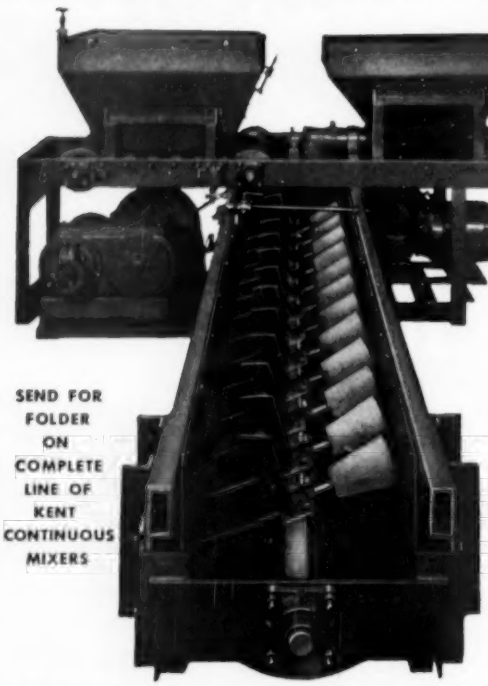
AVAILABLE 3 WAYS —

- ON LEASE BASIS
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(Shipping Weight—Approx. 14 Tons)

BERGEN MACHINE & TOOL CO., INC., NUTLEY, N. J.

KENT STEDIFLO for Economical, Volume Production of QUALITY CONCRETE



SEND FOR FOLDER ON COMPLETE LINE OF KENT CONTINUOUS MIXERS

Get the FULL EXPLANATION of these FEATURES

- LOW INITIAL COST
- MINIMUM MAINTENANCE COST
- NEGLIGIBLE LABOR COST
- LOW POWER COST
- HIGH PRODUCTION CAPACITY
- UNIFORMLY MIXED CONCRETE
- CONTROLLED OUTPUT
- STEADY PRODUCTION

WRITE for Complete Information

You can take the satisfied, enthusiastic word of the many KENT STEDIFLO users as your assurance of its efficient, economical operation, it's rugged construction and long service life with a minimum of maintenance expense. We'll be pleased to acquaint you with these fine people.

The **KENT MACHINE COMPANY**

CONCRETE PRODUCTS MACHINERY

Cuyahoga Falls, Ohio

ROCK PRODUCTS

IS READ BY THOSE WHO BUY YOUR PRODUCTS

●

structures and erection details for the plant to insure the highest efficiency of operation at the lowest first cost. At the same time he can also provide inspection and supervision to insure the proper execution of the building contract.

Anyone can be trained to be a "Handbook Engineer" to select beams and columns or equipment from handbooks published by industries interested in selling their products, but the most efficient utilization of structural material and equipment is the function of the trained professional engineer.

Too often, like Topsy, plants just grow without any thought of coordination. Operations become involved. Processes needlessly cross each other instead of taking the shortest straight line. With proper planning by the professional engineer this can be eliminated.

In many instances a plant is operated without thought of value of plant and equipment. Obsolescence has a way of creeping in and forcing equipment out of practical value before it is amortized. Here, the professional engineer can be of invaluable assistance in appraising equipment and establishing the true value which, when properly utilized by the accounting department, can often reduce taxes.

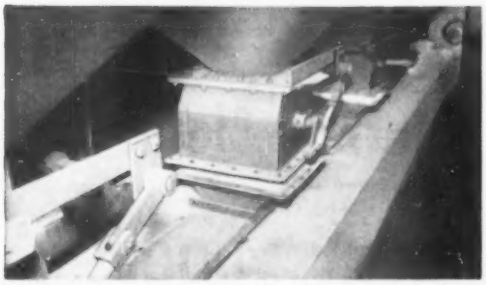
With higher and higher wages for less and less work not only must efficiency be maintained, but periodic studies must be made to relate operating costs to profits. To establish cost of operation, time studies and cost accounting systems must be established as a starting point. The professional engineer, with his knowledge of the limitations of the equipment, the efficiency of the production and his technical knowledge of equating various contingencies which make up a given operation, is best qualified to make time studies. Based on the results, his advice on cost accounting should be of untold value.

There are many other ways in which the professional engineer can be of valuable assistance. For instance, in his plant design he can make necessary provisions for reduction of insurance rates for fire and other natural hazards—as well as for safety, resulting in reduced liability and disability insurance rates. He can also advise on general purchases of maintenance supplies and equipment which, based on his broad experience, usually results in a material saving.

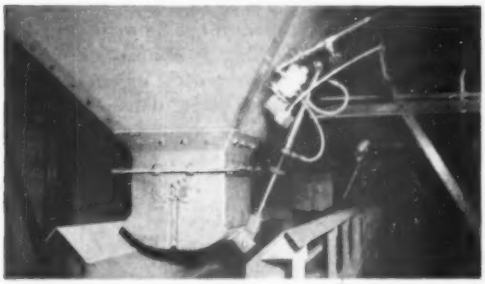
Some operators employ professional engineers on a full-time basis for their exclusive use, while others utilize their services either on an annual retaining fee basis or for each individual job. When employed on the retaining fee basis, the professional engineer is usually paid his fee monthly which entitles the operator to a certain amount of consultation. All design work, specification writing, travel,

(Continued on page 215)

ANOTHER LEVITTOWN and ANOTHER HELTZEL



Heltzel patented tubular valve eliminates jamming, has pin-point accuracy.



Double clamshell remote control aggregate gate adjustable to control speed.



Levitt's third Heltzel plant promises new concrete batching records for leading city builder.

famous city builder sets third HELTZEL plant into operation at fabulous Bucks County development

Down in Bucks County, Pennsylvania, William J. Levitt, head of the city building firm that bears his name, recently set into operation his third Heltzel concrete batching plant. The fact that his two previous Heltzel plants set record-smashing production records convinced him of Heltzel's ability to produce.

In fact, the first plant played a big part in helping him astound the construction world with his Long Island Levittown. It batched concrete on an average of 1800 cubic yards per day, and on occasion rang up amazing 2,000 yard plus days. His second Heltzel plant was used mainly in the construction of concrete blocks, and untiringly kept pace with the fastest concrete block production on record.



Clean line, all-welded A-frame comes completely assembled, easy to erect.

This new Heltzel plant promises even greater things. It's completely integrated—from supply hoppers to conveying equipment to automatic batcher—it's completely designed and built by Heltzel to give Levitt the nation's most efficient concrete batching. Its capacity is an astonishing 300 cubic yards per hour, it's fully automatic with high speed electronic batching that is accurate to the fraction of a pound; the entire operation is controlled from a central control area, and it bristles with many other new Heltzel exclusives that put an end to guesswork and human error in concrete batching.

Portable or stationary, large or small—if you want the finest in modern batching equipment get the Heltzel story before you buy. Heltzel engineers will be happy to work with you in developing just the plant you need for your operations.

The Heltzel Steel Form and Iron Co., Warren, Ohio

Another New Heltzel Installation



Curing Concrete Blocks?

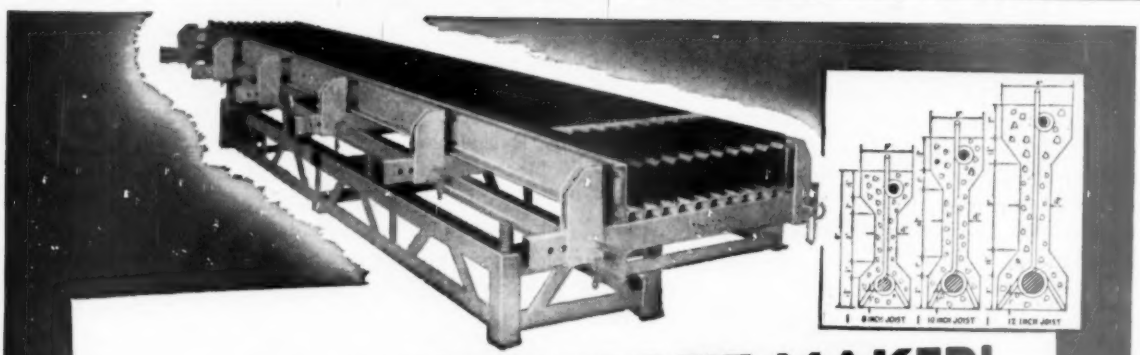
For the speedy charging and discharging of pressure curing chambers nothing can beat

BLAW-KNOX QUICK-OPENING DOORS

They reduce "door time" from minutes to seconds! No lugs, bolts, levers or sliding bars. Self-sealing gasket positively operated by internal pressure. Smooth-functioning ball bearing davit-type hinges. Manual or hydraulic operation. Adaptable to either vertical or horizontal vessels. Furnished in sizes up to 10 ft. diameter. For details on this and other Blaw-Knox equipment of interest to concrete product manufacturers, write for Bulletin No. 2355.

BLAW-KNOX

BLAW-KNOX COMPANY
BLAW-KNOX EQUIPMENT DIVISION
Process Equipment Department
Pittsburgh 22, Pa.



. . . ADD A NEW PROFIT-MAKER!
INCREASE YOUR VOLUME

Produce money-making concrete joists with the Kirk & Blum Heavy Duty Vibrating Table . . .

Cash in on the ever-growing demand for steel-reinforced concrete joists. Your experience and contacts in the building trade should make it easy to build up a profitable business in this new line. Concrete joists are simple to make, have unusual strength, are termite proof. The KIRK & BLUM Type "S" Heavy Duty Vibrating Table is capable of multi-production of concrete joists, allowing a fine profit-margin. Easily produced by unskilled operators. For complete details and prices, write to The Kirk & Blum Mfg. Co., 3210 Forrer Street, Cincinnati 9, Ohio.

Only small investment required!

The addition of the Kirk & Blum Vibrating Table to your present equipment requires a very small initial cost, enables you to make an entirely new line of 8", 10" and 12" joists in 20 and 24 ft. lengths.

KIRK AND BLUM

Manufacturers of steel forms of all types . . . Curb, Gutter, Sewer, Road

Professional Engineer

(Continued from page 212)

etc. are changed at a specified rate agreed to in the retainer contract.

Therefore, the services rendered by the professional engineer can be summed up to include:

1. Survey of operation
2. Advice on improvements
3. Specifications of equipment and method of operation
4. Detail design
5. Advice on purchases
6. Inspection and supervision of erection and operations
7. Time study
8. Cost accounting
9. Safety advice
10. Provision for reduction of various insurance rates

Ready Mix Strike Ended

A 12-WEEK STRIKE of some 550 ready-mixed concrete truck drivers of A.F.L. Teamsters Local 682 against firms of the St. Louis (Mo.) Ready-Mix Material Dealers Association was recently ended with what was termed a "total victory" for the union. Provisions won by the union in the new contract include: A wage increase of 15 cents per hour, retroactive to May 1, 1953, with an additional increase of seven cents effective May 1, 1954, in a contract to run through April 30, 1955; the issuance of separate payments for owner-operators of trucks which calls for payment on regular journeymen hourly rates and separate payment for use of their equipment; improved seniority provisions; better paid vacations, providing two weeks after five years of employment, in addition to the previous maximum of one week after one year of employment; and a new welfare program, financed by the employers. The welfare provisions require the employers to begin payments November 1 of $1 per week per employe into a welfare fund which will be used to finance hospital and surgical benefits, plus a $2500 double-indemnity life insurance. On January 1, 1954, this payment is to be increased to $2 per employe and the welfare coverage extended to families of the employes.

Ready Mix Plant

OOLITE CONCRETE CO., recently organized, has started operation of its new ready-mixed concrete plant at Jacksonville, Fla. Head of the new company is E. N. Belcher, Jr. William Clamp, Jr., is plant operating manager and J. R. Rankin is comptroller, both of whom were original employes of Miami Crushed Stone Co., when it was formed in 1945. William Burns, former employe of Peninsular Materials Corp., is superintendent of plant maintenance and automotive equipment, and Mac Lupfer, formerly of Material Sales Co., sales agency for Miami Crushed Stone and Peninsular Concrete Co., is sales representative of the new firm.

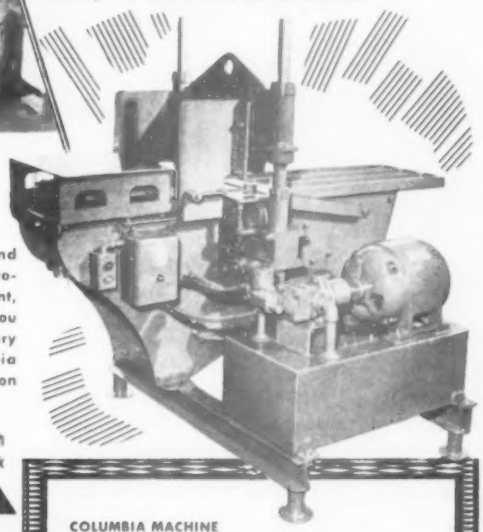


"complete satisfaction... with our Columbia BLOCK SPLITTER"

H. C. LUTES, *President*
Layrite Concrete Products
Spokane, Washington



"...It is well designed, compact and very portable...very handy in moving to various stock piles, saving us time and labor costs...has better performance . . . practically no breakage or waste," writes Mr. H. C. Lutes.



COLUMBIA'S LOW-COST PERFORMANCE KEEPS PROFIT MARGINS HIGH—

Columbia's semi-automatic and fully-automatic block splitters protect your profits through efficient, trouble-free performance...net you a larger return on your machinery investment. There's a Columbia Block Splitter to meet the production demand of your own market.

Let us show you how to cash in on the profitable split block business. Write today!

Columbia MACHINE

Home Office
107 S. Grand, VANCOUVER, WASH.
District Offices
Wisconsin, Ohio, South Carolina, Mississippi, Florida, New Jersey, Virginia, California.

COLUMBIA MACHINE
107 S. Grand, Vancouver, Washington

Please send me complete information about Columbia Block Splitters including price, terms and delivery.

Firm Name_____
Your Name_____
Address_____
City_____ Zone____ State_____

ROCK PRODUCTS FEATURES TIMELY INDUSTRY NEWS EACH ISSUE

NOW MORE THAN 140 LICENSED MANUFACTURERS Producing



Patented
homeward Concrete STEPS

A Small Investment That Pays Big Dividends

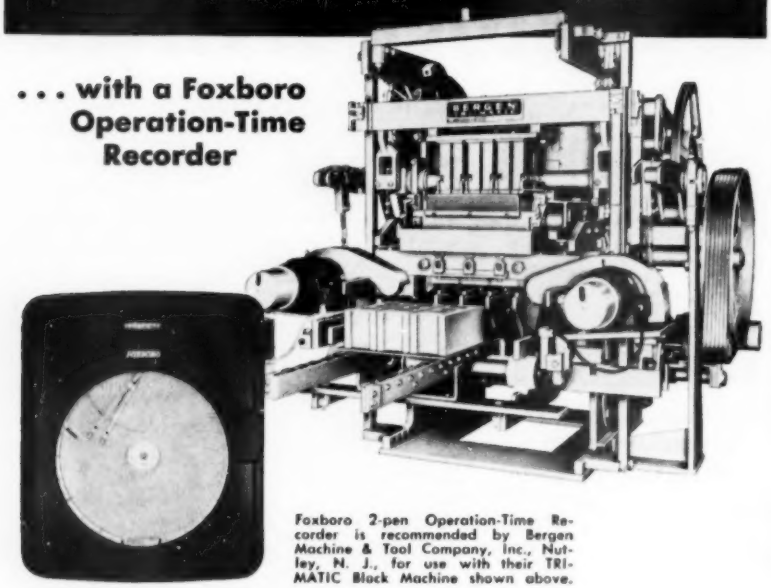
Homeward all metal forms are precision built to produce a product that requires no hand finishing.

The exclusive franchise for your territory may still be open.

For Complete Information Write
ROGER F. WILLIAMS, Licensor
3420 S. W. 9th St. Des Moines (15), Ia.

Locate Profit-Killing Slow-Ups In Your Block Production

. . . with a Foxboro Operation-Time Recorder



Foxboro 2-pen Operation-Time Recorder is recommended by Bergen Machine & Tool Company, Inc., Nutley, N. J., for use with their TRI-MATIC Block Machine shown above.

YOU CAN EASILY track down and eliminate causes of lost production when a Foxboro Operation-Time Recorder keeps a 24-hour check on your concrete block equipment.

Two separate records on the large, easy-to-read chart show time and duration of every interruption in block machine operation and also the exact count of batches mixed.

Plant foreman gets clear picture of operating efficiency plus definite proof of mixing time and cement-aggregate consumption. The instrument is available with as many as eight recording pens for use with a group of machines.

In addition to locating snags in production, the accurate, compact record simplifies bookkeeping and accounting. Application Engineering Data Sheet 320-6 gives complete information. Write for your copy.

THE FOXBORO COMPANY, 3010 NORFOLK ST., FOXBORO, MASSACHUSETTS, U.S.A.

FOXBORO
Reg. U.S. Pat. Off.

OPERATION-TIME RECORDERS

Quality Concrete Book

THE NATIONAL READY MIXED CONCRETE ASSOCIATION recently announced the issuance of the third edition of its publication "Control of Quality of Ready Mixed Concrete." The first edition of the book was prepared under the supervision of the association's technical problems committee and published in 1944. The demand was so great that the supply was soon exhausted so, with minor divisions, it was reprinted in 1945. This third edition, prepared by the engineering division of the association, includes some new material and important revisions, but follows the pattern of the first edition and makes use of its basic information.

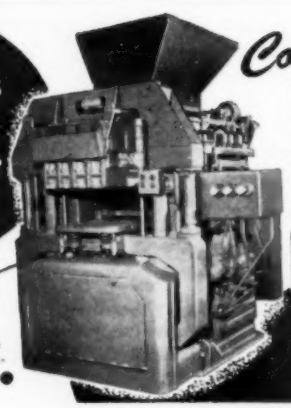
Subjects covered in the book include: The Control Problem; Bases of Purchase; Materials; Proportioning Concrete; Computing Batch Weights; Description of Terms; Batching Control; Mixing Control; Discharge Control; Inspection and Maintenance of Equipment; Cold Weather Concrete; Admixtures; Tests and Test Methods; Personnel; Over-Design to Meet Specifications; and Treatment of Concrete after Delivery. Appendices include: Specifications for Concrete Aggregates (A.S.T.M. C33); Determining Percentage of Sand by Fineness Modulus Method; Determining Percentage of Sand by Voids in Coarse Aggregate; Formulae Pertaining to Cold Weather Concrete; and a bibliography.

Copies of the third edition have been distributed to all members of the association and the book is also being made available to unaffiliated companies at $0.75 per copy.

Concrete Pavement

THE PORTLAND CEMENT ASSOCIATION has issued an illustrated booklet, entitled "Why Concrete?" The booklet, which is designed to promote the use of concrete pavement for turnpikes, highways and expressways, presents factual data to show why concrete provides a turnpike or highway with greater load-carrying capacity at lower cost, maximum safety with utmost convenience, and longer life with less maintenance.

more blocks *per minute...* more profit *per hour!*



Columbia's FULLY AUTOMATIC MODEL 8, 2-BLOCK

More blocks per minute means more profit per hour when you install the new, improved Model 8. Run fully automatic or semi-automatic, it efficiently and economically produces precision blocks in any shape that can be placed in a 16x18-inch opening. 15-second cycle on 8x8x16 blocks; faster on smaller units. Built for long, continuous, trouble-free performance!

FAST INSTALLATION AND MAINTENANCE SERVICE from headquarters in Wisconsin, Ohio, South Carolina, Mississippi, Florida, New Jersey, Virginia, Washington and California.

Yours FREE! Write today for your catalog of the complete Columbia line.

Columbia MACHINE WORKS
107 SOUTH GRAND • VANCOUVER, WASH.



You're in the picture...

in the Portland Cement Association's advertisements month after month in leading farm papers and home magazines. These ads:

1. Tell of the beauty, economy and structural advantages of concrete masonry.
2. *Presell* prospects in your area on concrete masonry houses and farm buildings.
3. Direct the prospects *to you* for more information and assistance.

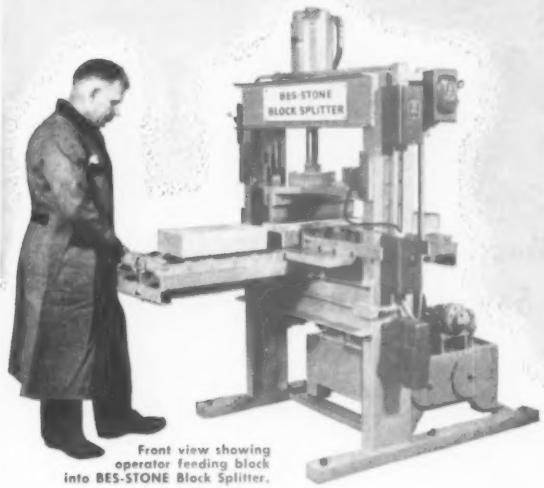
When these prospects call, help them with their plans and problems. They will appreciate receiving the names of architects, builders and financing organizations experienced in concrete masonry construction. Such assistance helps turn inquiries into sales.

To have as many prospects as possible calling *on you*, make it a practice to mention, by page and magazine name, the current PCA ad in your own newspaper, radio, television or direct-mail advertising. Explain that your plant is local headquarters for concrete masonry construction information.

Tying in with PCA ads and following through with helpful service helps increase business.

PORTLAND CEMENT ASSOCIATION
33 West Grand Avenue, Chicago 10, Illinois
A national organization to improve and extend the uses of portland cement and concrete . . . through scientific research and engineering field work

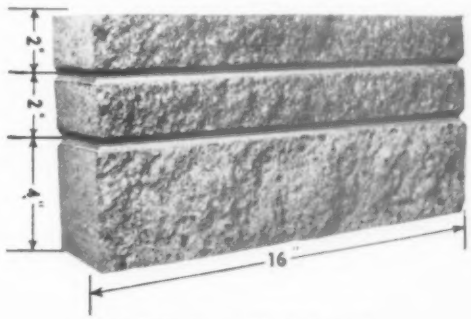
BES-STONE
BLOCK SPLITTER



Front view showing operator feeding block into BES-STONE Block Splitter.

- **Operates Automatically**
- **Produces 960 Split Block Per Hour**
- **Easily Adjusted for Various Heights**
- **Splits in a Straight Line — No Culls**
- **Has a Powerful Hydraulic Action**
- **Combines Quiet Operation with Safety**

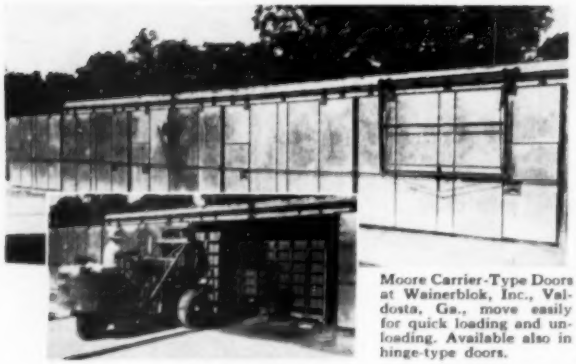
Here is another Besser machine — the BES-STONE Block Splitter — designed primarily for the Concrete Products Industry. The machine splits block with speed and precision, in a variety of modular sizes. It's fully automatic. The block is placed under the knife automatically . . . the blade descends with a smooth, hydraulic action . . . and the split block is ejected by the incoming block. The operator is always at a safe distance. The BES-STONE Block Splitter enables plant operators to offer additional lines and affords new profit possibilities. Write for Bulletin No. 95A.



BES-STONE in Modular Sizes

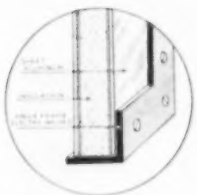
BES-STONE, the product of the BES-STONE Block Splitter, is a new masonry unit with a split-stone appearance, made in many sizes and in a series of attractive, permanent colors. You'll find it complements, and greatly increases your sales of standard stripper block.

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Complete Equipment for Concrete Products Plants
BESSER MFG. CO., ALPENA, MICH., U. S. A.



Moore Carrier-Type Doors at Wainerblok, Inc., Valdosta, Ga., move easily for quick loading and unloading. Available also in hinge-type doors.

Moore Metal-Insulated Kiln Doors Save Fuel—Reduce Curing Time



Keep heat where it belongs—inside the kiln—with Moore Aluminum-Insulated Doors. They improve curing conditions—save steam—last longer.

Send us dimensions of present door openings for quotation.

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Oldest and Largest Manufacturers of Lumber and Veneer Dryers

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SELL MORE BLOCK ON EVERY JOB!

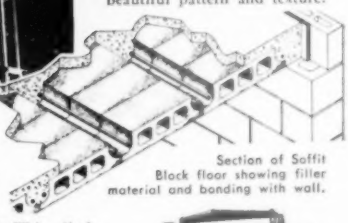


Furnish VIBRAPAC SOFFIT BLOCK for ALL FLOORS and ROOFS



Removing Centers from Finished Floor.

Permanent, Fireproof Floors and Roofs. Low initial cost and maintenance. Natural base for radiant heat installations. Provide surface of maximum acoustical and insulation value. Can be plastered, or if left exposed, makes a ceiling of beautiful pattern and texture.

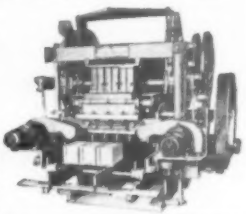


Section of Soffit Block floor showing filler material and bonding with wall.

Soffit Block are supported in place with temporary adjustable steel centers while reinforced concrete slab is placed and cured. This eliminates timber shoring and leaves space below clear during construction.

BESSER VIBRAPAC PRODUCES SOFFIT FLOOR AND ROOF UNITS

The same machine that produces high quality concrete masonry units in all styles and sizes, using Plain Pallets. Continuous, full capacity operation. Fully automatic. No machine operator required.



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ALPENA, MICHIGAN, U. S. A.

Complete Equipment for Concrete Products Plants

FREE SERVICE for Buyers

Get information and prices quickly on machinery, equipment. Check item (or items) about which you desire information. Send to us.

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Research Service Department

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- ___Aggregates (special)
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- ___Air Separators
- ___Asphalt Mixing Plants
- ___Bagging Machines
- ___Bags
- ___Barges
- ___Batchers
- ___Belting, Conveyor, Elevator, Power Transmission
- ___Belting, V-type
- ___Belt Repair Equipment
- ___Bin Level Indicators
- ___Bins and Batching Equipment
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Firm Name_____

Street_____

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CP-10

"ECONOMICAL .. ..extremely satisfactory operator efficiency"
– Says Southern Block and Pipe Corporation, Norfolk, Virginia

GERLINGER FORK LIFT TRUCK VITAL TO BLOCK AND PIPE OPERATIONS!



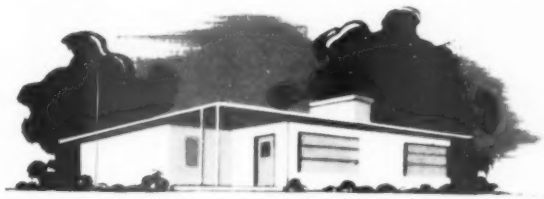
Southern Block and Pipe Corporation, Norfolk, Virginia, had a problem with lifting, moving and storing cumbersome concrete pipes... 36" through 72" inside diameter in six lengths. But today an 8-ton capacity Gerlinger Fork Lift Truck (PH 862—130") is making "light work" of this heavy job. "Could not do without it in our operations," states Mr. Richard C. Goodman, secretary-treasurer of the firm.

Mr. Goodman is enthusiastic about the Vickers hydraulic steering (standard on all PH models) which permits operator to maneuver capacity loads with a touch of the finger. In his words: "Operator efficiency of this fork truck is extremely satisfactory and the simple controls plus hydraulic booster steering enables us to get our work done with minimum of lost motion."

The counter-active weight distribution of a Gerlinger Fork Lift Truck makes it ideal for off-size lifts. 54% of the truck's weight is where it's needed...over the front wheels...for maximum traction and easy maneuverability. Drop us a postal today. We'll send an illustrated folder showing all the job-proved features which guarantee a Gerlinger will out-perform all others in the most rugged material handling job you can produce!

GERLINGER CARRIER CO.

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They will appreciate your suggestion of...

Trinity White

The mass of dazzling white or the truer colors and tints made with Trinity white cement gives distinction to any structure—large or small. Your recommendation to use Trinity white will be appreciated and remembered by all concerned with that building.

A Product of GENERAL PORTLAND CEMENT CO.
Chicago • Dallas • Chattanooga • Tampa • Los Angeles



As white as snow



...plain or waterproofed

GET HIGH EARLY STRENGTH CONCRETE PRODUCTS

with Standard Cement plus Solvay Calcium Chloride

- Cuts in half curing or protection period
- Produces high early and ultimate strength
- Provides extra cold weather protection
- Includes "built-in" curing
- Permits quicker deliveries
- Lowers your costs

To speed up operations and permit use of products in shorter time — especially in cold weather — add Solvay Calcium Chloride to your Portland Cement mixes. You get better workability, improved appearance, more uniformity and greater economy. In poured products, Solvay Calcium Chloride doubles your output and improves quality. Works equally well with all Portland Cements, including standard, high early, air entrained and low heat cements.

Send for FREE Book Containing Full Details

"How to Get Better Concrete Products at Lower Cost" is filled with important information and answers to your questions about the use of Calcium Chloride in concrete. For your free copy, mail coupon below.

SOLVAY CALCIUM CHLORIDE

SOLVAY PROCESS DIVISION, Allied Chemical & Dye Corporation
61 Broadway,
New York 6, N. Y.

Please send me, without any obligation, your free book, "How to Get Better Concrete Products at Lower Cost."

Name .....

Company .....

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CP-10



a rugged small truck
Model F-4R
4,000 lbs. capacity

HERE'S A NEW

Erickson

For tricky ramps, rough or soft ground, cramped quarters—you will quickly become a booster for Erickson F-4R ease of handling, traction, balance, ruggedness. Comfortable seating space reduces operator fatigue. The F-4R is designed for more work per day—built for lower cost per year. Erickson quality is economy for you! Forks, mast and lift heights as ordered, twin tilt cylinders, 4 speeds forward, 4 speeds reverse. Side-shifter, scoop and other attachments available.

Send for Erickson Catalog on platform trucks to 7000 lbs. cap. and fork models 2000 to 20,000 lbs. cap.

- Short Wheelbase & Turning Radius
- Complete Operator Vision
- Large 10-Ply Pneumatics
- 12" Center Underclearance
- Amazing Ease of Handling



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1405 Marshall St. N.E. • Minneapolis 13, Minn.

Erickson THE WORKHORSE OF LIFT TRUCKS

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ORDER TODAY!

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USED EQUIPMENT FOR SALE

1—Model 383A Smith Mixer, mounted on model 710 White.
3—Model 409 Smith Mixers, mounted on model WA22 Whites.
All 3 cubic yard—high discharge—mechanically OK and in daily operation.

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CONCRETE BRICK COLORS
CEMENT COLORS
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made by
BLUE RIDGE TALC CO., INC.
Henry, Virginia

UNBREAKABLE
PALLET RINGS
Write for full information
TEXAS FOUNDRIES
LUFKIN, TEXAS

BUILD GOOD WILL

Advertising necessities for the block industry. Line Pins, Twigs, Modular Coursing Stick. Also the new Block Calculator and Wood Corner Block. All imprinted with your advertising. Complete catalog on request.

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FOR SALE

1—Kent #4 Flo Master.
1—FMC Model #12 Batch Mixer.
Price—$750.00 each.
Both in excellent condition.

MACLAY CONCRETE, INC., FESTUS, MO.

Safer . . . Happier



thanks to Christmas Seals!

Like a protective radar network, a barrier formed by Christmas Seals helps to guard us against tuberculosis.

The money which *you* donate for Seals fights TB the year round—with continuing medical research, education, rehabilitation, and case finding.

To keep the barrier high, send your contribution today, please, to your tuberculosis association.

Buy Christmas Seals

Because of the importance of the above message, this space is contributed by

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WANTED: Septic Tanks that need cleaning!

BIONETIC is a safe, sure, economical method.
Cleans sewage solids from tank.
Eliminates odors.
Cleans tile fields, prevents plugging.
Cleans grease traps.
Harmless to humans and plumbing.

BIONETIC at $4.25 per pound, or case of 12 one pound containers $48.00, 25 pound drum $3.25 per pound.
Some Dealer and Distributor Franchises open.
Advisory Service, write us.

P. O. Box 6724, Dept. CPM **RELIANCE CHEMICALS CORPORATION** **Houston 5, Texas**

APPLEY BLOCK MACHINE
(COMPLETE WITH)

25 metal racks.
1400 (8x8x16) Steel Pallets.
94 Aluminum Pallets.
Double Bull Nose Sash Attachment.
100 Double Bull nose sash Pallets.
Bull Nose Attachment.
300 Bull Nose Pallets.
315 (8x12x16) Foundation Pallets.
Package Price $2500—used, but good condition.

Interested in purchasing used 4 inch Bell-type Concrete Tile Machine.

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FAIRBURY, NEBR.

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A CONCRETE PIPE & BLOCK PLANT

Covers six acres on railroad in Maryland. Make pipe 8" to 48". 2 new Block machines. Reason for selling, health failing. BOX L-82, CONCRETE PRODUCTS, 309 W. Jackson Blvd., Chicago 6, Ill.

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PRICED FOR QUICK SALE

1—6,000 lb. capacity Clark Lift Truck on solid tires. $500.00 F.O.B. Plant.

GOREMOND BROS.
BOX 82, GROSVENORDALE, CONN.

STOP *that* WATER

With FORMULA NO. 640
A clear liquid—7 different resins in a solvent which penetrates 1" or more into concrete, concrete blocks, stucco; seals, holds 1250 psf water pressure. Applies quickly—no mixing—no furring—no membranes—no cleanup. Use on forms—wood or concrete.
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KEEP ABREAST
WITH
INDUSTRY TRENDS
THROUGH
ROCK PRODUCTS

PUMICE AGGREGATE
SHALEX AGGREGATE

"Lightweight Aggregates with a future"

The Central Oregon Pumice Co.
125 Oregon Ave., Bend, Oregon
Plant Ph. 275—Office Ph. 166
(Write or call for further information)

FOR SALE: STROUDSBURG MACHINE PIPE FORMS, NEW AND NEVER USED

6—12x2x3' Reg. T&G Jacket.
2—24x3x3' Reg. T&G Jacket.
2—15x2½x3' Reg. T&G Jacket.
1—30x3½x3' Reg. T&G Jacket.
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These forms for sale well below cost.
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Excellent deposits of Pumice. More than 15,000,000 cubic yards of high grade pumice and pumicite suitable for diversified building material, lightweight aggregate, paint manufacture, scouring and abrasive compounds. Two miles of paved highway. Low freight rate. For sale or lease by owner.

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1—Besser Batch Mixer (30 ft.)
100—Steel Racks (72 Block Type).
3600—Plain Steel Pallets.

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LOWER COST
PACKER-HEAD WINGS
Proved to last as long or longer—yet cost considerably less. Write for prices.
TEXAS FOUNDRIES
LUFKIN, TEXAS

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ALMOST LIKE NEW AND GUARANTEED

18 all-steel forms for casting concrete slabs in 18 different designs, all complete. You can make sidewalks, patios, sun decks, porches, fish ponds, swimming pools, walls, etc. Price $79.50 cash.

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FOR SALE

2—Stearns No. 9 Jolteretes, equipped with dual shaft vibration, power carriage, air operated offbearers and electric height controls. Each machine with 8" modular 45° reliinable attachments.
2—Stearns 42 c.f. mixers with 30 h.p. motors.
2—Stearns 42 c.f. vertical skip loaders complete with motors and starters.
1—8" Bungalo Siding attachment complete.
4", 6", and 12" modular, reliinable attachments.
Press steel, modular, pallets for all attachments.
100 Chase Model 294 steel racks.
All of above equipment in extra good condition.

GUY D. MOODY
1011 Chester Street, Bristol, Va.

new truck-man 40



designed . . .

. . . FOR CUBING AND LOADING BLOCKS

THAT'S RIGHT, the new Truck-Man Model 40, two ton, High Lift was designed from forks to engine, especially for handling blocks. It is not just another industrial truck with special forks.

BIG 7.50 x 15, 10 ply Road Lug pneumatics on the drive wheels and 6.00 x 9, 8 ply rib pneumatics give you plenty of traction and footing for yard work. The big Ford engine, for ample power, and the short, 72", turning radius for peak maneuverability, mean that the Truck-Man 40 will really do a job in curing kilns and plant as well.

HERE ARE THREE BIG REASONS WHY THE 40 IS EASY AND ECONOMICAL TO MAINTAIN, TOO:

1 RUGGED — The big Ford Industrial Engine, oversized clutch, heavy duty transmission and axles insure less maintenance.

2 ACCESSIBLE — The tilt cylinder is mounted above floor decking for easy adjustment or service. Clutch, transmission or axles are removed in minutes for bench repairs. No need to pull engine for work as head and oil pan are easily removed.

3 STANDARD FORD PARTS — Serviceable at any Ford garage, include: hydraulic brakes, engine, differential, clutch, drive axle, and wear parts of steering axle.

Write or check coupon and mail for catalog with complete details on the Model 40 and 8 other versatile Truck-Man trucks.

truck-man
Div. of The KNICKERBOCKER CO.
650 Liberty St., Jackson, Michigan

☐ Have Salesman Call
☐ Send Catalog and Further Information

Name _____
Title _____
Address _____
City _____ Zone ____ State _____

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All your equipment comes from one responsible manufacturer, on one order and in one shipment. In dealing with one source, you can be sure of undivided attention to your problems and interest in the successful performance of your equipment.

ONE SOURCE FOR SERVICE AND PARTS

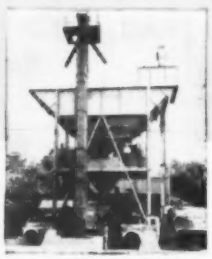
You have a nearby source of replacement parts and prompt, efficient maintenance service from one dependable distributor organization. One Blaw-Knox trained man can service all your equipment, give *preventive* maintenance to your "Complete Blaw-Knox Package".

ONE SOURCE FOR ALL YOUR EQUIPMENT

The Blaw-Knox "Complete Package" contains every piece of equipment you need for profitable ready-mix operations. Whatever type of work you do, there's a combination of Blaw-Knox equipment in a "package" tailor-made for your requirements and with the flexibility to handle many other applications where the same equipment can be profitably used.

ONE FINANCIAL ARRANGEMENT

You have just one financial contact, and one financial arrangement covers all your equipment when you buy a one-source "package". Whether you are an established operator, or just entering the profitable ready-mix field, you'll benefit by this convenient "Complete Package" system.



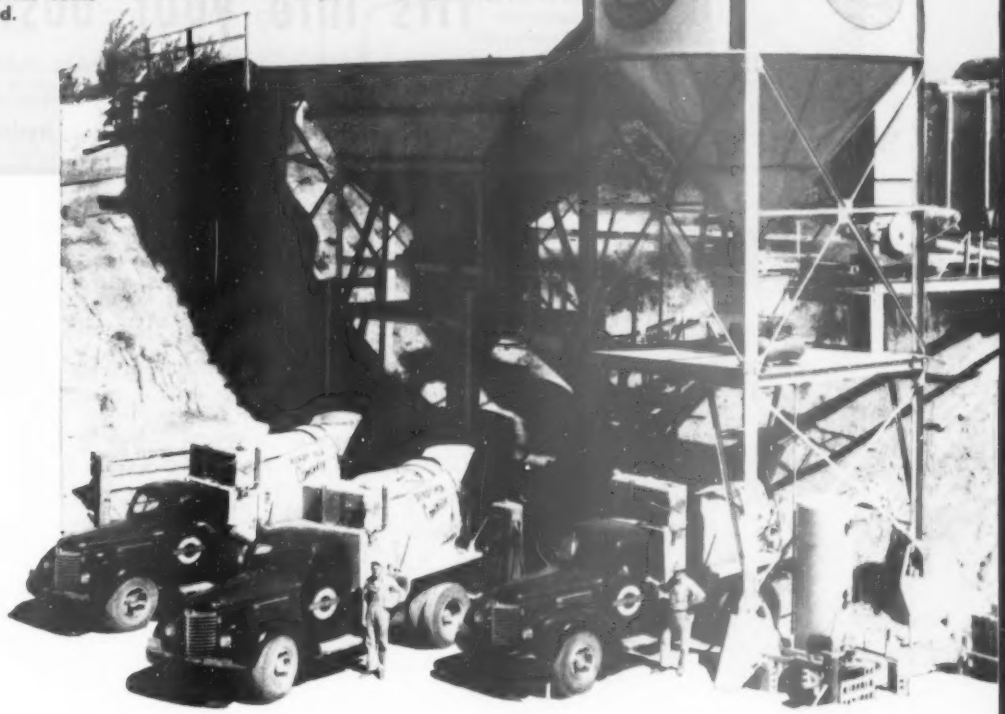
TRUCK MIXER LOADING PLANTS

Complete one-stop plants for loading truck mixers of all sizes and types with accurately measured quantities of aggregate and cement. Bins may be compartmented to suit your needs.



CLAMSHELL BUCKETS

Blaw-Knox Clamshell Buckets are available in a wide range of sizes, weights and types for every material handling, hard digging or general purpose requirement.



AGGREGATE BATCHING PLANTS

For fast, accurate batching. Portable for easy moving. Self-cleaning bins, equipped with automatic, semi-automatic or manual weighing batchers, are available in 2-, 3- and 4-compartment styles, in capacities from 100 to 120 tons.

HI-BOY TRUKMIXERS

As the lightest-weight heavy-duty complete truck mixer available, the Hi-Boy saves time and money by hauling bigger pay loads at lower cost per yard.

BULK CEMENT PLANTS

Cut the cost of handling large volumes of cement. Storage bins and weighing batchers can be supplied in any type or style for your requirements. 200- and 400-bbl. sizes available, with combination arrangements which double these capacities.

BLAW-KNOX

BLAW-KNOX COMPANY
BLAW-KNOX EQUIPMENT DIVISION
Farmers Bank Building
PITTSBURGH 22, PA.
Offices in Principal Cities

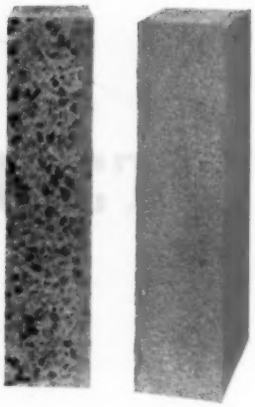
BLAW-KNOX

GET BLAW-KNOX "COMPLETE PACKAGE" ADVANTAGES

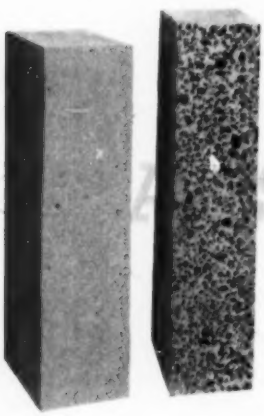
for every concrete highway or airport paving job. The Blaw-Knox "Complete Paving Package" includes Steel Road Forms, Clamshell Buckets, Aggregate and Cement Batching Plants, Subgraders, MultiFoote Concrete Pavers, Spreaders and Finishing Machines. See your Blaw-Knox distributor for details.

YOU'VE HEARD ABOUT IT...

YOU'VE READ ABOUT IT...



NOW...find out how CALSI-CRETE



fits into your business !

Calsi-Crete, a lightweight load-bearing hydrous calcium silicate, is being acclaimed as the ideal building material based upon years of successful use in Europe. It can be used as load-bearing building blocks, roof planks, insulating roof slabs, cores for firedoors and partitions, and many other applications.

Autoclaved hydrous calcium silicate products made by the Calsi-Crete process offer these outstanding advantages:

1. Light but strong, with high thermal and sound insulation qualities. (K factor for 45 lb. per cu. ft./load-bearing Calsi-Crete is only 1.1 Btu./Ft. ^{2}hr. compared with 9.1 for dense concrete.)
2. Stable, durable, fireproof and hygienic.
3. Great resistance to water penetration and frost action because of unicellular structure. Cracking is avoided by negligible wetting and drying movement, least of any known building material.
4. Can be cut, sawed, drilled, chased, screwed and nailed, and provides an excellent key for plastering and rendering.
5. Cost is less than brick, dense concrete or wood in finished construction.
6. Easily made with raw materials abundant in virtually every part of the country.
7. Ease of handling lowers production and utilization costs.
8. For applications where load-bearing is not a factor, Calsi-Crete can be made with 20 lb. per cu. ft. density and a K factor of 0.6.

CALSI-CRETE *corporation*

321 N. HAMILTON
SAGINAW, MICHIGAN

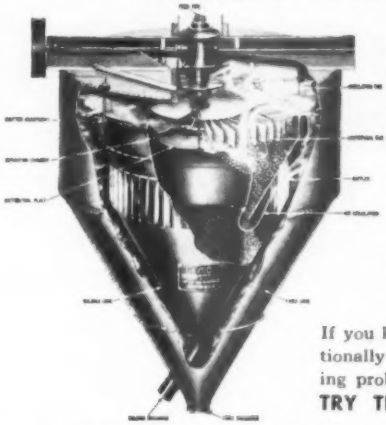
Write today! Information on the profitable Calsi-Crete franchise is now available!

GAYCO CENTRIFUGAL SEPARATORS

GAYCO Separators, equipped with the adjustable centrifugal sizing fan — an exclusive GAYCO feature — make closer separations. Closer separations bring about higher production through efficient removal of the fines made by the mill. Closer separations bring about higher quality products by eliminating all undesirable oversize.

"TIMKEN BEARING EQUIPPED"

GAYCO brings you all these:



Range 60 to 400 mesh
Greater Capacity
25 to 30% greater production
Cleaner Tailings
Uniform Products
Slow speed for slow wear
Quick and easy adjustments

If you have an exceptionally hard separating problem, **TRY THE GAYCO.**

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BLAW-KNOX *TIGHT LIP* BUCKETS
DESIGNED FOR HANDLING



- CEMENT CLINKER
- LIMESTONE
- GYPSUM ROCK

For complete information, construction details and specifications . . .
WRITE FOR BULLETIN 2378

BLAW-KNOX Buckets are built especially for low-cost handling of bulk materials in cement plants. Tight fitting lips of cast chrome-nickel-molybdenum alloy steel prevent leakage and resist abrasion to insure long dependable service. Available in a wide selection of capacities and weights to get the most from your crane.

BLAW-KNOX COMPANY
BLAW-KNOX EQUIPMENT DIVISION
2035 Farmers Bank Bldg., Pittsburgh 22, Pa.
Offices in Principal Cities

BLAW-KNOX CLAMSHELL BUCKETS FOR CEMENT PLANTS

FREE SERVICE for Buyers

Get information and prices quickly on machinery, equipment. Check item (or items) about which you desire information. Send to us.

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Research Service Department
ROCK PRODUCTS
309 W. Jackson Blvd. Chicago 6, Ill.

- Admixtures, Aggregate
- Aftercoolers, Air
- Agitators
- Aggregates (special)
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- Air Separators
- Asphalt Mixing Plants
- Bagging Machines
- Bags
- Barges
- Batchers
- Belting, Conveyor, Elevator, Power Transmission
- Belting, V-type
- Belt Repair Equipment
- Bin Level Indicators
- Bins and Batching Equipment
- Bits
- Blasting Supplies
- Block Machines, Concrete Building
- Bodies, Trailer
- Brick Machines and Molds
- Buckets
- Bulk Cement Handling Equipment
- Bulldozers
- Cars, Industrial
- Central Mixing Plants
- Classifiers
- Clutches
- Coal Pulverizing Equipment
- Concentrating Tables
- Concrete Forms
- Concrete Mixers
- Concrete Mixing Plants
- Concrete Specialty Molds
- Concrete Waterproofing and Dampproofing
- Conveyors
- Crushers
- Coolers
- Cranes
- Curing Equipment
- Derricks
- Dewatering Equipment, Sand
- Diesel Engines
- Dragline Cableway Excavators
- Draglines
- Dredge Pumps
- Drilling Accessories
- Drills
- Dryers
- Dump Bodies
- Dust Collecting Equipment & Supplies
- Electric Motors
- Engineering Service, Consulting and Designing
- Explosives & Dynamite
- Fans and Blowers
- Feeders
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- Flotation Equipment
- Front End Loaders
- Gasoline Engines
- Gear Reducers
- Generator Sets
- Grinding Media
- Gypsum Plant Machinery
- Hard Surfacing Materials
- Hoists
- Hoppers
- Kilns: Rotary, Shaft, Vertical
- Locomotives
- Lubricants
- Magnetic Separators
- Masonry Saws
- Mills
- Pipe
- Pumps
- Scales
- Screen Cloth
- Screens
- Scrubbers: Crushed Stone, Gravel
- Shovels, Power
- Speed Reducers
- Tanks, Storage
- Tires and Tubes
- Torque Converters
- Tractor Shovels
- Tractors
- Trailer Dump Bodies
- Trucks, Bulk Cement
- Trucks, Industrial
- Trucks, Mixer Body
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If equipment you are in market for is not listed above, write it in the space below.

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RP-10

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"CROSS" Special Analysis Screen Steel with SQUARE, HEXCREEN or ROUND Perforations on close Centers—provides ACCURACY of product size, with LESS Blinding and LONGER Screen Life.

For
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Services of CROSS Field Engineer and Technical Data on Request

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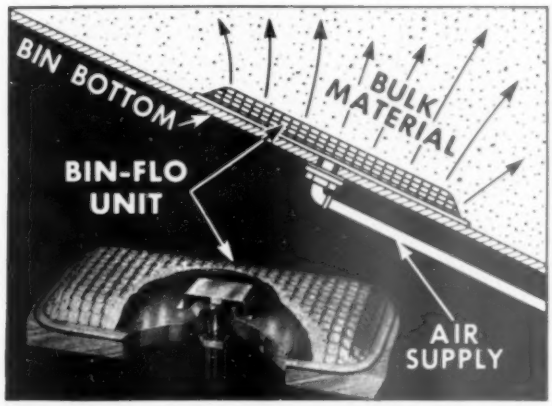
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Manufacturers • Carbondale, Pennsylvania • Telephone: 300

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BIN-FLO

USES SMALL VOLUME OF AIR AT LOW PRESSURE

KEEPS BULK MATERIALS MOVING

BIN-FLO units in bins, chutes, hoppers, etc., restore flow characteristics to dry, finely ground materials which tend to pack or bridge in storage. Types for all materials and conditions. No moving parts; simple installation; negligible operating cost; no maintenance cost.

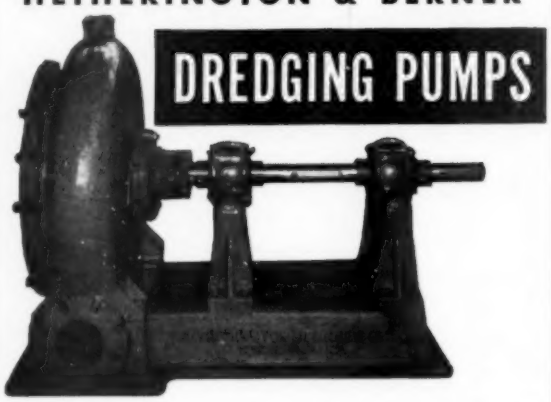
BIN-DICATOR bin level indicator—"The Eyes of the Bin"—automatically reports levels of materials in storage; automatically controls filling machines; prevents waste.

NEW 20-PAGE BOOK FREE

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DREDGING PUMPS

performance-proven on the toughest jobs

H&B ESTABLISHED 1907

Hetherington & Berner sand and gravel pumps are available in two general types: *STANDARD*, (4", 6" and 8" sizes) with semi-steel parts, for ordinary working conditions and moderate heads; and *DREADNAUGHT*, (6", 8", 10", 12" and 15" sizes) with manganese steel parts, for heavy duty jobs with stringent head conditions.

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HETHERINGTON & BERNER INC.

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ROCK PRODUCTS

HAS THE LARGEST ABC CIRCULATION AND HIGHEST RENEWAL PERCENTAGE IN THE NON-METALLIC MINERALS INDUSTRY

WHERE TO BUY

CARLYLE

INDUSTRIAL RUBBER PRODUCTS FOR EVERY PURPOSE

IMMEDIATE DELIVERY OF CONVEYOR, ELEVATOR AND TRANSMISSION BELTING — FIRE, WATER, SUCTION, AIR, STEAM AND WELDING HOSE

WHY WAIT

We have 8 to 48

RUBBER CONVEYOR BELTING

TOUGH COVERS—Heavy duty, specially compounded abrasive resistant rubber covers having high tensile strength. Thoroughly capable of withstanding the abrasive action of bulk materials. Properly vulcanized to the carcass to assure utmost performance, economically.

STRONG CARCASS — Constructed of finest quality 28 and 32 ounce tough cotton duck, properly treated and impregnated to avoid mildew from moisture and atmospheric conditions. Each ply thoroughly embedded in rubber to prevent ply separation.

FLEXIBILITY — Careful attention has been given in the construction of all belts to have the proper flexibility assuring the following desirable features; troughs easily, runs true on all idlers, gouge resistant, excellent for long and short hauls and slope installations.



Avoid delays in your production schedules!

We carry in stock for your immediate requirements, Conveyor Belting in widths from 8 inches to 48 inches.

Width	Ply	Thickness Top Cover	Thickness Bottom Cover	Type of Duck Carcass
8"	4	1/16"	1/32"	28 Oz.
10"	4	1/16"	1/32"	28 Oz.
12"	4	1/16"	1/32"	28 Oz.
14"	4	1/16"	1/32"	28 Oz.
16"	4	1/8"	1/32"	28 Oz.
18"	4	1/8"	1/32"	28 Oz.
20"	4	1/8"	1/32"	28 Oz.
20"	5	1/8"	1/32"	28 Oz.
24"	4	1/8"	1/32"	28 Oz.
24"	5	1/8"	1/32"	28 Oz.
26"	5	1/8"	1/32"	28 Oz.
30"	4	1/8"	1/16"	32 Oz.
30"	5	1/8"	1/16"	32 Oz.
30"	6	1/8"	1/16"	32 Oz.
36"	6	1/8"	1/16"	32 Oz.
42"	5	1/8"	1/16"	32 Oz.
48"	5	1/8"	1/16"	32 Oz.
48"	8	1/8"	1/16"	32 Oz.

INQUIRE FOR SIZES NOT LISTED. ELEVATOR TRANSMISSION & V-BELTING ALSO IN STOCK

All our belting made by the leading belting manufacturers.

Write for Free Booklet on Installation, Care & Maintenance of Conveyor Belting.

SEND US YOUR INQUIRIES FOR OTHER RUBBER PRODUCTS.

CARLYLE RUBBER CO., Inc.
62-66 Park Place, New York 7, N. Y.
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FOR VALUES — BUY BRILL

KILNS — DRYERS

2—9' x 80' Allis Chalmers, ⅝" shell.
2—8' x 125' Vulcan, ⅝" shell.
2—7' x 160' Vulcan, ⅝" shell.
2—7' x 120' Vulcan, ⅝" shell.
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1—7' x 55' Bartlett Snow, ½" shell.
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1—6' x 60' Allis Chalmers, ½" shell.
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6—6' x 25', 6' x 30', 6' x 40' steam tube.
1—5' x 67' Reeves, 5/16" shell.
1—5' x 60' Vulcan, ⅜" shell.
1—4'6" x 50' Vulcan, ⅜" shell.
1—4'6" x 30' Louisville, ½" shell.
2—3'10" x 16' Link Belt, Roto-Louvre.
1—2'7" x 8' Link Belt, Roto-Louvre.

PULVERIZERS — MILLS

3—Raymond High Side Roller Mills, 3, 4, 5 Roll.
2—#40, #50 Raymond IMP Mills.
2—#412, #512 Raymond Bowl Mills.
2—Williams 4 & 5 Roll High Side Mills.
4—Hardinge 4½'x16", 6'x22", 6'x48", 10'x48".
3—Patterson 6'x8' Ball Mills.
2—Abbe 5' x 8'6", 5' x 22' Silex-lined Tube Mills.

CRUSHERS

1—Simons 4' Cone Crusher.
1—Traylor 56" x 24" Crushing Rolls.
1—Allis Chalmers 36" x 48" Jaw Crushers.
10—Jaw Crushers 5"x6" to 24"x36".

SCREENS — SEPARATORS

6—Tyler Hummer Screens 3'x5', 4'x5', 4'x7', 4'x10', 5'x10', 4'x15'.
5—Rotex 40"x84", 40"x120".
3—Air Separators 6', 8', 10', 14'.

MISCELLANEOUS

12—Bucket Elevators 20' to 90' centers.
5—Belt Conveyors 24" to 36".
2—Akins 54"x34', 2'x15' Classifiers.

PARTIAL LIST

Send us your inquiries

BRILL EQUIPMENT COMPANY
2401-3 Third Ave., New York 51, N. Y.
Tel: Cypress 2-5703

Special Crushers ! !

Symons 4' coarse bowl cone, also has fine grinding liner.
Symons 3' cone, thoroughly reconditioned.
Pennsylvania C-4-36 Reversible Hammermill
Cedar Rapids 4033 Hammermill. Diesel powered
Raymond No. 412 bowl pulverizer mill.
FARREL BACON 36" x 48" Jaw Crusher
Traylor TY 4' with 250 hp. electric motor

DREDGES

Ellicott 12"x10" new pump with new V-12 885 HP Diesel engine. Port. steel hull.
Ellicott 8" with cutter. Diesel Hull 45'x15'x3'6"
8" Hydraulic. Diesel. On 32'x8' steel pontoons.
Ameco 10" Diesel power portable. Excellent.
6" portable Diesel complete with cutters, etc
6" H-P twin Diesel drive. Complete.

CONCRETE PLANTS AND EQUIPMENT

Heltzel 1000 bbl. cement silo with elev. scales, etc
Smith 56-S two yard tilting mixer. Complete.
Erie 3 compt. 100 ton aggr. bin 3 yd. batcher.
Heltzel 150 tons 3 compt. aggr. bin 250 bbls cement
Johnson 3 compt. 100 ton aggr. 400 bbls. cement bin w/5 24"x120' B-G aggr. conveyor.
Butler 250 bbls. cement bin with B-K 100 ton 3 compt. agg.
NEW F-S 100 ton agg. bin 3 compt.
NEW F-S 400 bbl. cement bin complete.

CRUSHING PLANTS

Cedar Rapids Portable Super Tandem, excellent.
Pioneer 40-V. New 1946. Portable. Diesel power
Pioneer WA 300, crushing, washing, screening.
Cedar Rapids AAA Port. Primary crusher 20x36
Cedar Rapids 40x33 Port. Secondary. Diesel.

CRUSHERS

JAW: Acme 10x20, 14x28, 14x28, 10x42, 10x32, 18x32, 25x40. Eagle 20x36. Diamond 24x36". Cedar Rapids 10x20, 20x36, 25x40. Farrell 10x20, 12x30, 14x36, 18x36, 36x48. Buchanan 36x42. Good Roads Reliance 15x30. Traylor 18x36, 24x36 Allis-Chalmers 30x18. Good Roads 10x30. Telsmith 18x32. Champion 1030, 1040, 1236, 1530
GYRATORY: Allis Chalmers-McCully, 6", 7½", 8", 8", 12K, 20", 30", 42", 16". Newhouse, 24", 36". Gyrasphere, 18", 18". Intercone Telsmith, Telsmith 5H, 10-B, 13-B, 16-B. Kennedy Van Saun 7, 19, 25½-S, 27. Traylor Ty 1'6", Ty 2'6", T-4½".
ROLL: Cedar Rapids 40x20. Diamond 40x22. Pioneer 30x18. Telsmith 24x16. Pioneer 80"x18" New Holland 24x16.
HAMMERMILL: Rhe 4 Williams Jumbo, Pennsylvania SX2. 22x22. Cedar Rapids 20x32. Jeffrey 36x42, Jeffrey 36x24, 36x40.
BALL MILL: Hardinge 10'x48". K.V.S. 6'x8' Type M Air swept J-H 6'x6', Hardinge Conical 6'x22' Colorado Iron Works 5'x6', Marcy No 64½. Hardinge conical 10'x36".
ROD MILL: March 2'x6', 3'x8'. Allis Chalmers 6'x8'. Hardinge No. H 208. Marcy 8'x12' Hardinge 8'x22'.
CONE: Symons 2' coarse bowl, 3' standard head.
TUBE MILL: Smidth 5½x20, K.V.S. 6'x7', Tray Inc 5'x22'.
DRIERS: Struthers-Wells 7'x64'; others 7'x20', 6'x30', 7'x70', 6'x40' and Cedar Rapids 60"x24'

SHOVELS—CRANES—DRAGLINES

N-W 80-D 2¼ yd. Dragline. Diesel. 100' boom.
N-W Model 8, 1½ yd. Diesel Shovel.
Lima Mod. 36, 1 yd. Shovel-Crane-Dragline. Gas
Buc-Erie 51-B Diesel Shovel. Practically new.
Northwest 80-D Diesel Shovel 2¼ yd. Recond.
Lorain L-820 2 yd. Shovel-Drag Crane 100' Bm.
Northwest 80-D Shovel-Drag. New 1948. Excellent
Lima 1201, Comb. Shovel-Drag, 80' Bm.
Lima 1201, 2½ yd. Diesel Shovel.
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Buc-Erie 54-B Diesel Shovel, 2¼-yd.
Lorain Model MC 414, Moto-Crane, 85' Bm. Exc

SCREENS

Seen Double deck 6'x12'.
Kennedy-Van S. 4'x10' three deck.
Telsmith heavy duty washer 60"x13'.
Diamond 4'x10' three deck.
Link-Belt 4'x12' single deck.
Simplicity 4'x10' four deck.
Symons 4'x14' double deck.
Tyler 4'x10' two deck heavy duty, motor, Gen. Set.
Robbins Vibrex 3½ deck 4' x 12' Model 48-144.

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2 Cat. D8 Angledozers with DDPCU rebuilt.
Int. TD-18A with B-E Bulldozer.
Int. TD-24 with B-E Cable Bulldozer.
Al-Chal HD19 Angledozer, Hydraulic.
Al-Chal HD7 with Gar Wood angledozer.
Allis Chal. HD-19 with hydraulic control angledozer
Cat. D4 Traxcavator with 1 yd. bucket, hydraulic

LOCOMOTIVES

45 ton G.E. Diesel Elec. Loco. std. ga.
25 ton Plymouth gas loco. std. ga.
Vulcan 20 ton standard gauge type 0-4-0 gas
20 ton Vulcan gas, std. ga., rebuilt.
25 ton Vulcan steam std. ga. Side tank
15 ton Whitcomb 36" ga. gas.
Plymouth Model LLDA standard gauge 10 ton diesel.

DERRICKS

Steel 50 ton stiff leg derrick 86' boom. Complete
American Terry 20 ton Guy Derrick 100' bm
Clyde 30 ton stiff leg 90 ft. boom
Guy Derrick 15 tons 115' mast 105' boom
American 25 ton stiff leg derrick 90' boom
Special 35 ton stiff leg derrick 100' boom.
Nat'l. Bridge 30 ton Guy Derrick 100 ft.
American 30 ton stiff leg 100' boom.

ASPHALT PLANTS

Madsen 4000# Port. Complete. Excellent.
H-Green Port. cooling, 842 Mixer, 852 Dryer
Overmander Monotrete Bit. Mixing Plant, T-34 Model S-100 Simplicity. Diesel powered.
Hetherington-Berner Moto-Paver
Pioneer Model 101, complete. New 1948.
Cummers-Road Semi-Port. 1500# Pugmill.
Cedar Rapids Travel-Roadmix Plant Model 50

CABLEWAYS

Sauerman slack line 1¼ yd.; electric 90' mast
Sauerman 1 yd. with 100 hp. electric motor, complete
Sauerman 1 yd. with Waukesha gas hoist.

RICHARD P. WALSH CO.
30 Church St. — New York, N. Y.
Cortland 7-0723 — Cable: RICHWALSH

1—20-36 Ball Bearing Cedar Rapids Jaw Crusher.
1—15-40 Ball Bearing Good Roads Jaw Crusher.
1—10-30 Ball Bearing Good Roads Jaw Crusher.
1—10-24 Ball Bearing Universal Jaw Crusher.
1—9-36 Ball Bearing Telsmith Jaw Crusher.
1—9-21 Ball Bearing Telsmith Jaw Crusher.
1—2'4" Traylor T. Y. Reduction Crusher.
1—40" Telsmith Reduction Crusher.
1—32" Telsmith Reduction Crusher.
1—13" Telsmith Gyratory Crusher.
1—5' x 12' Two-Deck Telsmith Screen. New.
1—4-Cylinder Buda Diesel.
Motors, 200 H.P., 100 H.P., 75 H.P. and smaller.

BLUE BALL MACHINE WORKS
Blue Ball, Pa.

FOR SALE

One Fleming Automatic 180 Serial 326 with Pr. Head (1 yr. old).
One Fleming Automatic 180-4 Serial 102 (5 yrs. old).
Nine Molds 4"-6"-8"-12".
Fleming Mixer (3 sack) with 25 H.P. Motor.
One Fleming Elevator 12" x 25' with motor.
50 Steel Racks with approximate 4,000 wood pallets 2" thick.
Yale Rubber-tired hand Lift Truck.

PRICE—$5,000 Terms available.

CONTACT

BOYD BLOCK PLANT
522 S. Mills Avenue, Farmington, New Mexico

Conveyors - Idlers - Belting Scales - Screens

Immediate shipment from stock

NEW TROUGHING IDLER CONVEYORS

We take our loss on our stock of short length belting and previous model idlers. You can save as much as 50% by buying the BONDED CONVEYOR SPECIALS listed, with conveyor belting in two pieces. Belting is 4 ply, 28 oz. duck, 1/8" top rubber cover and 1/32" bottom cover.

Quantity	Belt Width, Inches	Length of Conveyor, Feet	List Price	Sale Price
1	18	25	$1229	$ 658
1	18	35	1558	814
1	18	50	2054	1043
1	18	85	3209	1581
1	18	125	4529	2096
1	24	30	1507	824
1	24	45	2062	1085
1	24	65	2721	1451
1	24	85	3542	1806
1	24	100	4097	2037
1	30	25	1421	886
1	30	35	1841	997
1	30	65	3101	1617
1	30	80	3731	2295
1	30	100	4571	2768
1	30	125	5621	2818

TROUGHING IDLERS & RETURN ROLLS

3-roll Troughing Idlers for these sizes:

16" belt	$17.25	30" belt	$19.50
18" belt	18.00	36" belt	20.25
24" belt	18.75	48" belt	21.75

1-roll Return Idlers for these sizes:

16" belt	$6.75	30" belt	$8.25
18" belt	7.13	36" belt	8.75
24" belt	7.50	48" belt	10.25

All steel. Interchangeable with other well-known makes. Replaceable ball bearings. Rust proof ball races; maintenance is negligible.

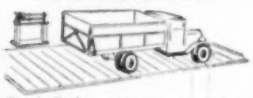
CONVEYOR BELTING

Famous brands at deep cut prices. Fresh stock.

Width	Ply	Top Cover	Bottom Cover	Duck Carcass	Price
18"	4	1/8"	1/32"	28 oz.	2.50/ft
24"	4	1/8"	1/32"	28 oz.	3.23/ft
30"	4	1/8"	1/32"	28 oz.	3.97/ft

Write for Free Belting Sample

MOTOR TRUCK SCALES



20 Ton Truck Scales	$525.00
26 Ton Truck Scales	582.00
33 Ton Truck Scales	855.00

Others to 50 ton capacity. All complete with structural steel weighbridge.

VIBRATING SCREENS

Heavy duty eccentric-shaft types; 1 to 5 decks, 3'x8' to 5'x14'. Others from 2'x4'. Wire cloth or plate included to your specifications.
Priced from $431.00

Mfrs. of Scales, Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers and Feeders

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JEFFREY ELEVATOR

never used

Unit #1 Track Hopper 6' x 10'6" in plan made of ¼" steel plate.

Unit #2 Belt Feeder 9'0" centers, 18" wide, 4 ply, 28 oz. duck with ⅛" rubber cover—speed 125 FPM, rating 30 ton per hour, 1½ HP Motor, 550 volt, 60 cycle, 3 phase, 125 RPM.

Unit #3 Bucket Elevator 17'3" centers, speed 125 FPM, rating 30 ton per hour, #6150 steel knuckle chain, 6.05 pitch, 3 HP Motor, 550 volt, 60 cycle, 3 phase, 1800 RPM—reduced to 68 RPM.

SUN OIL COMPANY
Department J.E.—2, Philadelphia 3, Pa.

FOR SALE

Universal Model 3240 Portable Impact Master Complete with 3' x 12' Apron Feeder and shovel loading hopper, grizzly and by pass chute. "V" belt drives, powered by Murphy ME-66, 5th wheel and dolly, air brakes. All mounted on 12—10.00 x 20 pneumatic tires with complete inventory of space hammers, liners and wearing pacts to place mill in like new condition. This mill has produced only 250,000 cubic yards of stone.
Price, $24,000.00.

Wisconsin Foundry and Machine Company Portable Secondary plant equipped with 3' x 10' Jigger 2 deck vibrating screen, 42" x 24" rolls, pneumatic tires, ratovator wheel, powered by ME-66 Murphy Power Unit. Overhauled last fall.
Price, $12,500.00.

Both of the above units are an exceptional buy and must be seen to be appreciated.

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- 1—637 CFM Chi. Pneu. OCE Comp. dir-connected to 125 HP Syn. Motor, new 1944.
- 1—45 Ton Clyde Whirley 100' B. 3/60/440V.
- 1—10 Ton Krane Kar Pne. Tires.
- 1—20 Ton Ohio Steam Locomotive Crane.
- 1—30 Ton Orton Diesel Loco. Crane.
- 1—50 Ton Diesel Loco. Crane.
- 1—20 Ton Browning Truck Crane, new 1951.
- 1—35 Ton P&H 355 Truck Crane, new 1952.
- 1—25 Ton G.E. Diesel Elec. Loco.
- 1—30 Ton Davenport Diesel Locomotive.
- 2—44 Ton G.E. Diesel Elec. Locos.
- 1—45 Ton G.E. Diesel Elec. Locomotive.
- 1—100 Ton GMC Diesel Elec. Loco.

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Welded
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- 75 gearmotors ½ to 15 hp.
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- Overhead electric hoists, ½ to 1½ ton.
- Overhead air hoist, 3 ton 12' lift.
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- Apron conveyors and belt feeders.
- Davis #1 vertical key seater.
- Ercolite transformer welder, 200 amps.
- Silent chain drive, 200 hp. Link belt.
- Gruendler hammermill, 24" x 14".
- Stedman B30 hammermill, 30" x 24".
- Pennsylvania SXT-8 hammermill.
- Double crushing rolls, smooth, 24" x 14".
- Single and double roll coal crushers.
- Champion 1030 roller bearing jaw crusher.
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- American Standard Disintegrator, #24.
- Electric carpullers and cranes.
- Single and Double deck Universal screens.
- Selectro single deck 4'x6' vibr. screens.
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- Elevator parts: Buckets, chain, sprockets.
- Enclosed chain bucket elevator, 8" x 43'.
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- Enclosed chain and belt type bucket elevators.
- Open inclined bucket elevator, 14" x 60' Cont.
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- New and used belt idlers 14" to 42".
- Conveyor pulleys, 12" to 54" dia. with drives.
- New and used conveyor belt, 12" to 36" wide.
- Gravity conveyor, gears, V pulleys, etc.
- Bucket elevators and belt conveyors to sketch.

G. A. UNVERZAGT & SONS
136 Coit St., Irvington, N. J.

FOR SALE

CRUSHING PLANT—Sacrifice by owner.

- 30 x 18 Universal Double Roll Crusher.
- 4 x 8 Niagara Screen.
- 4 x 12 Seco Double Deck Screen.
- 6" Water Pump.
- 18" x 50' Conveyor.
- 16" x 30' Conveyor.
- 2 Sand Classifying Tanks.

All the above equipped with V belt drive electric motors and magnetic starters in good running condition. Property lease expires soon and we are offering all the above equipment as is—where is—$6750.00 CASH.

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DELRAY BEACH, FLORIDA
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Columbia 8 Automatic 2 bl. machine, complete with 1200 steel pallets and offbearer. No molds. This machine is in good condition, but was replaced with the new Columbia combination drain tile and block machine. Vaughn Block Company, Russellville, Tennessee. Price $7,500.00. TERMS.

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Columbia 8, Nashua Tile Co., Nashua, Iowa, also traded in on the new combination drain tile and block machine.

Columbia 8, Mukwonago Cement Products Co., Mukwonago, Wis.

Lith-i-bar 2 bl. machine. Complete $4,000.00. Acme Block Co., Harriman, Tennessee.

F.M.C. 180 Complete with molds, racks and pallets. Wilson Concrete Products Co., Belleville, Ontario.

Praschak 2 bl. Automatic machine. Mukwonago Cement Products Company, Mukwonago, Wis.

Jolterete 7 and 9.

MID-WESTERN CONCRETE EQUIPMENT CO.
Box 646
Mukwonago, Wisconsin

ALSO SEE READY-MIXED CONCRETE AND CONCRETE PRODUCTS EQUIPMENT
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Quarry Equipment

2540 Cedarapids 4A primary unit, diesel power.
2036 Cedarapids AAA portable primary, diesel power.
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60-ton, 2-comp., 8'x18' storage bin w/clam gates.
Special bins to your specifications.
Conveyors—18"—24"—30"—36". Also belt.

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Lorain 40 truck crane.
Link Belt LS85 Diesel Combination.
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Lorain 30A, ½-yd. gas combination.

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Sanderson-Cyclone No. 42 well drill.
Sanderson-Cyclone No. 44 well drill.
1952 Model 40 Keystone w/truck & tools.

TRUCKS

27FD rear dump Euclids.

AIR COMPRESSORS

500 cu. ft. Gardner-Denver diesel, rebuilt.
365 cu. ft. Gardner-Denver. New condition.
195 cu. ft. Schramm gas powered on 4 steel wheels.
Worthington 2-stage, water-cooled, vertical 250#, 60 CFM, new condition.

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MATERIAL LOADERS

PETTIBONE MULLIKEN "121" Swing Loader, ¾ yd., 4-wheel drive. Demonstrated 30 hours, @ Dealer's Cost.
PETTIBONE MULLIKEN "15" Demonstrator Front End Loader, 1½ yd., 4-wheel drive. Will discount.
CLETRAC "DDH" Diesel Tractor w/Drott Hi-Lift Front End Loader, 1½ yd. Bucket.

CRANES & SHOVELS

LINK-BELT "LS-40" ⅝ yd. Dragline & Fairlead—Or as a Trench Hoe.
OSGOOD "200" ½ yd. Trench Hoe.
SCHIELD-BANTAM "M-4" ⅜ yd. Hoe & Crane, mounted on Half Track.
SCHIELD-BANTAM Shovel Attachment only—for "M-4".

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WAUKESHA "6MZ" 65 H.P. Gas Power Unit. Cheap.
CEDARAPIDS Portable Primary Plant on Pneumatics w/1524 Jaw Crusher, 24" x 6'0 Apron Feeder, gas power, 30" discharge conveyor, etc. Bargain.
REX 2 yd. Hi-Discharge Mixer w/Ford Truck.
JAEGER 3 yd. Hi-Discharge Mixer w/Chevrolet Tandem Truck.

Note: This equipment is all located in our yard.

EIGHMY EQUIPMENT COMPANY
Rockford, Illinois

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6" x 3" to 60" x 48"

Before buying or selling any FARREL-BACON JAW CRUSHERS it will pay you to consult

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RIDGEWOOD, NEW JERSEY
Engineers and Manufacturers
Machine Shop Facilities
FEEDERS, Conveyors, Screens, etc.
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18"x36" Jaw, Traylor, Bulldog.
14"x16", Bartlett & Snow, 2 roll.
48" Symons, vert. disc.
42"x14" Traylor, 2 roll.
50" Raymond, 5 roll, high side.
54" Raymond, 4 roll, high side.
Raymond #1 w/feed conveyor and cyclone.
Abbe Rotary Cutter #0.

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4700 CFM, Buell, type AC-130 9½ AL.
4700 CFM Buell type AC-130 9½ AL. SS lined.

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All sizes, from 1000 to 75,000 CFM.

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Syntron, type F350 vibrating.
Allis Chal. 26"x12"x6' vibrating.
Fuller 8", star type.
Fuller 12"x13" rectangular.

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9' x 80' x 8½".
7' x 160' x 8½" (2).
7' x 120' x 8½" (2).
310-16 Roto-Louvre.
5' x 67' x 5/16".
5' x 30' x 8½" Ruggles-Cole.
4'6" x 50' x ⅜" with lifters.
4'6" x 40' x 8½" Traylor.
4' x 30' x 8½".

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23" x 12' Pug, double shaft, L.B.
4' x 20' Paddle, double shaft.
6' x 8' Abbe, ball.
6' x 8' Patterson, Pebble.
Size B, Abbe.

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6500 gal. 76"x27' 10". Extra heavy.

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24 Magor 30 yd. steel air dump cars. Drop door type. Built 1951. Like new.

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4 GE Diesel-elec. locomotives. 44 ton. Cat D17000 engs. New 1951. Like new.

4 GE Diesel-elec. locomotives. 25 ton. Cummins 150 HP engs. New 1950.

Mississippi Valley Equipment Co.
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Byers ⅜ yd. $1000.00
Byers ⅜ yd. 71W Traveler, on rubber, air controlled $7000.00

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Yaeger 125, 1 yr. old $2000.00
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Layne-Northwest pump complete with 2 sets of bowls and 25 hp. motor, switches, etc. $1000.00

20 Ton Low Boy Trailer with G.M.C. tractor & winch $3000.00

GLENDENNING LIMESTONE
Darlington, Wisconsin

7'x60' Christie indirect heat dryer.
Nos. 12, 9, 8, 7½ and 6 Allis-Chalmers gyratory crushers.
222, 322, 636 & 236 Allis-C Hydrocone Crushers.
1—42"x16", 36"x16", and 24"x12" crushing rolls.
1 Complete lime hydrating plant.
1—42"x48", 24"x36", 18"x36", 15"x30", 12" x 24" jaw crushers.
1 800-1200 or 1500 bbl. cement plant.
14", 16", 8" and 6" McCully Superior Gyratory Crusher.
5' x 50' x ½" dryer, 8' x 80' & 7' x 120' kiln.
New and Rebuilt Dryers—Kilns and Coolers

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FOR SALE

1—54 inch by 10 ft. 11 inch heavy duty apron feeder $3,500.00
1—8 ft. by 125 ft. Vulcan kiln $6,000.00
1—402 Raymond bowl mill $3,000.00
1—4 ft. by 10 ft. two deck Seco screen $500.00
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Other related equipment such as elevators, conveyors, etc. also available. Above items include motors where is and as is unless agreement to load is made at time of sale.

LOUISVILLE CEMENT COMPANY
SPEED, IND.

DEPENDABLE USED MACHINES

Special,—Diamond 9x18 roller bearing jaw crusher; new jaws, cheek plates, toggle, etc.

Bay City 1¼ yd. shovel	Robins 20" belt tripper	Pioneer 3x10 screen
Lorain ¾ yd. shovel	Pioneer 3'x14' scrubber screen	40' bucket elevator
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P&H ½ yd. crane	Cedar Rapids 40x20 roll crusher	Le Roi VPI motor

These machines reconditioned in our newly-built daylight plant. Come see them!

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3—100 Ton Amer. Diesel Elec.
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1—20 Ton Whitcomb Gas.
1—10 Ton Davenport Gas.

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24 x 36 Buchanan Sectional Jaw.
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15 x 36 Farrel B Stat. Plant.
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36" Traylor Ty Gyrat.
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24 x 36 Diamond Primary Portable Diesel.
10 x 36 Diamond Portable Secondary.
10 x 36 Austin Portable Secondary.
#880 Universal Jr. Gravelmaster.
#880 Universal Sr. Gravelmaster.
Telsmith Port. 18 x 32—28" Gyrat.
22 x 36 Cedar Rapids Port. Primary with Diesel.

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676 Ft. Worthington Electric.
1180 Ft. Chgo. Pneu. Elec.
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2300/250 V.

300 KW G.E. Mercury Arc Rectifier.
150 KW Westgh. M.G. Set.
200 KW G.E. M.G. Set.
300 KW Westgh. M.G. Set.

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Complete 2½ yd. **READY MIX PLANT.**
Pioneer 2436 Jaw, 40x22 roll **CRUSHING PLANT.**
CENTRIFUGE: 54x70" solid bowl continuous.
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MILLS: Williams Comet Roll, Raymond 38" vertical, 6x12' Marcy Rod, 4x5 & 5x6' Ball.
GRINDING BALLS: 223,000# of 7/8x1¼" New.
DRAGLINES: Koehring 501, Link Belt L885, Lorain 820, P&H 1055LC, Northwest 95.
SHOVELS: ½ yd. Link Belt, Lorain 80 & 40, Buckeye 70, NW25, Marion 7, P&H 655B, Lorain 77, Lima 802, Bucyrus 44B, 54B, 75B & 80B, Lima 802, 1201.
24x36" on 111' centers **BUCKET CONVEYOR.** 24" x 420' & 24x100' Noble Conveyors.

MID-CONTINENT EQUIPMENT CO., INC.
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JAW TYPE: 24x36, 25x40, 28x36, 40x48, etc.
CONE TYPE: Symons 2, 3, 4 and 5½'. No. 36 Telsmith. Also Kennedy 19, 29, 37 and 49. Traylor 1'8" and 2'4" TT. Newhouse 7, 10 and 14". Steadman 24, 30 and 36" Impsat. Allis-Chalmers Ty. B.
ROLLS: Allis-Chal. 72x30, 54x24, 54x20, 40x15 and 18x10. Pioneer 18x30. Universal 16x24. New Holland 24x16 and 16x16. McLanahan 18x34 and 18x30.
HAMMERMILLS: Williams Nos. 2, 3, 4 and 6. Day Nos. 40 and 70. Gruendler 2XB and 3XB. Dixie 2040, 3650 and 5040, and others.
MILLS: Hardinge 3'x8", 6'x22", 6'x3' and 8'x4'. Kennedy 4x8, 5x6, 5x11. Marcy 4x5, 6x4, 7x16. Raymonds, Sturtevants and others.
CRUSHING PLANTS: 24x36, 28x40, 30x42 and smaller. Also complete stationary plants.
DRYERS: 90"x60', 7'x50', 10'x90', 8'x50'. Etc.
SCREENING PLANT: Large modern plant new in 1946, priced at ⅓ original cost.
DRAGLINES: Page 8 yd. 160' Bm.; Page 6 yd. 125' Bm.; 5W Monighan 5 and 7 Yd. 125'.
BINS & BATCHERS: 20 yd. capacity & larger.

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Barges, Bins, Buckets, Boilers, Cableways, Cars, Compressors, Conveyors, Cranes, Dryer, Derricks, Draglines, Drag Scrapers, Dredges, Drills, Engines, Elevators, Excavators, Generators, Hoists, Kiln, Locomotives, Loaders, Motors, Pipe, Pumps, Rail, Scales, Screens, Shacklines, Shovels, Tanks, Trucks, Tractors, Etc., in many sizes, types and makes at low prices. (I have equipment at many points in the United States and Canada. What you need may be near your plant.)

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--anywhere!

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NEW RAILS RELAYERS IN STOCK—PROMPT SHIPMENT

All sections, new and relaying Rails, Angle Bars, Frogs, Switches, Spikes, Bolts and all accessories; cars and locomotives.

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Sand plant; rotary sand dryer complete with 8 ton self feeder screening equipment; 18 ton storage bin mounted so dump trucks can be loaded; also electric motors, conveyor belts, two dump trucks; 5 yard body; one front end loader. Loading equipment for loading box cars and gondolas; also sand pit; new pits to be opened. Price: $13,000. Would consider partner.

WICK SAND CO., Lock Box 257, BERLIN, WIS.

FOR SALE
ONE GERLINGER FORK LIFT TRUCK

Model PH862-130, 9 Ton Capacity, 16' Lift, 48" Forks, Pneumatic Tires. PRICE: $5,400.00 F.O.B. Brooklyn.

A. & A. MACHINERY CORP.
468 Troutman St., Brooklyn 37, New York

FOR SALE

1—48" x 36" jaw crusher No. 3281.
1—42" x 18" x 24" inclined L.B. elevator.
1—10" McCully crusher A.C. No. 8278.
1—24" x 12" x 18" vertical L.B. continuous bucket elevator.

Other related equipment such as elevators, conveyors, etc. available. Above items include motors where in and as is unless agreement to load is made at time of sale.

LOUISVILLE CEMENT COMPANY, SPEED, IND.

ENGINEER — WANTED

A recently built, modern operation in Northern New York State is looking for a Graduate Engineer (preferably mechanical or chemical) with 5 or 10 years experience in the processing of non-metallic ores or the manufacture of Portland cement. Experience in plant layout and design, familiarity with material handling. Salary open -- Reply giving references and resume of education and experience, and salary expected. BOX L-86, ROCK PRODUCTS, 309 W. Jackson Blvd., Chicago 6, Ill.

PRODUCT DESIGNERS AND DRAFTSMEN

Internationally prominent manufacturer of heavy machinery used in mining, crushing, cement and basic processing industries, located Midwest, has excellent opportunities for Mechanical Design Engineers and Draftsmen for research and development and new product design. Liberal employee benefits, plus exceptionally fine working conditions and opportunity for future. Write stating experience, present employment, personal data and salary expected. Replies confidential.

BOX L-81, ROCK PRODUCTS, 309 W. Jackson Blvd., Chicago 6, Ill.

KEEP ABREAST WITH INDUSTRY TRENDS THROUGH ROCK PRODUCTS

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2 ROTARY KILNS ⅛ IN. THICK
7' x 5'6" x 60' LONG.
LOCATED IN ARKANSAS.

W. H. FRIEND, M.E.
60 E. 42nd St., N. Y. 17, N. Y.

ELECTRICAL MACHINERY

Motors and Generators, Control and Repair Parts. Large Stock. New and Rebuilt. Guaranteed Expert Repair Service. Send us your inquiries.

V. M. NUSSBAUM & CO.
Fort Wayne, Indiana

FOR SALE

1—Cyclone Model #2400 used 9" blast hole drill full crawler equipped with power tool wrench. Drill used but one month. Priced to sell. Also Bit Sharpening Machine.

SANDERSON CYCLONE DRILL CO.
ORRVILLE, OHIO

FOR SALE

792—8" steel pallets.
206—8" steel pallets Cor. & Jbs.

Business Men's Paper Press Co.
Wayland, Michigan
Tel. 2251

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Sand Pit Machinery. Consisting of 2—6 in. sand pumps, 2 cranes in good condition, other things to go with it. Unlimited sand deposit (more or less glass) can be leased. Over 400 acres bordering river south of Elmer, Okla., and lays between railroad and highway. Bridges going to Vernon, Tex. Contact:

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Chicago 6, Ill.
Ph. Franklin 2-4186

Operation
Plant Layout
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FOR SALE

Partner's one-half interest in Sand & Gravel Production & Contracting business. Both stationary and semi-portable washing plants. Indefinite lease, low royalty, good material and demand. Central Illinois location. Cover 30 mile radius. Can be partially financed. Possession Jan. 1, 1954.

BOX L-88, ROCK PRODUCTS
309 West Jackson Blvd., Chicago 6, Illinois

ALSO SEE READY-MIXED CONCRETE AND CONCRETE PRODUCTS EQUIPMENT WHERE TO BUY ADVERTISING IN CONCRETE PRODUCTS SECTION

CLASSIFIERS: 4—Akins 54"x34' and 4—Wemco 78"x28½', Simplex, double pitch, weir type, with 220/440 volt synerogear motor and lifting device. Four located in Nevada. NEW condition.
JAW CRUSHER: 1—Telsmith 18x32 roller bearing Jaw Crusher, V-belt drive.
REDUCTION CRUSHER: 1—Symons 3 ft., short head.
AIR SEPARATORS: Bradley 16 ft. and Sturtevant 10 ft. with or without motors.
PULVERIZERS: Hardinge steel lined conical Ball Mills complete with motors and auxiliary equipment for dry grinding, sizes 5'x22", 10'x36", and 10'x48". Marcy 8x12 Rod Mill, center peripheral discharge.
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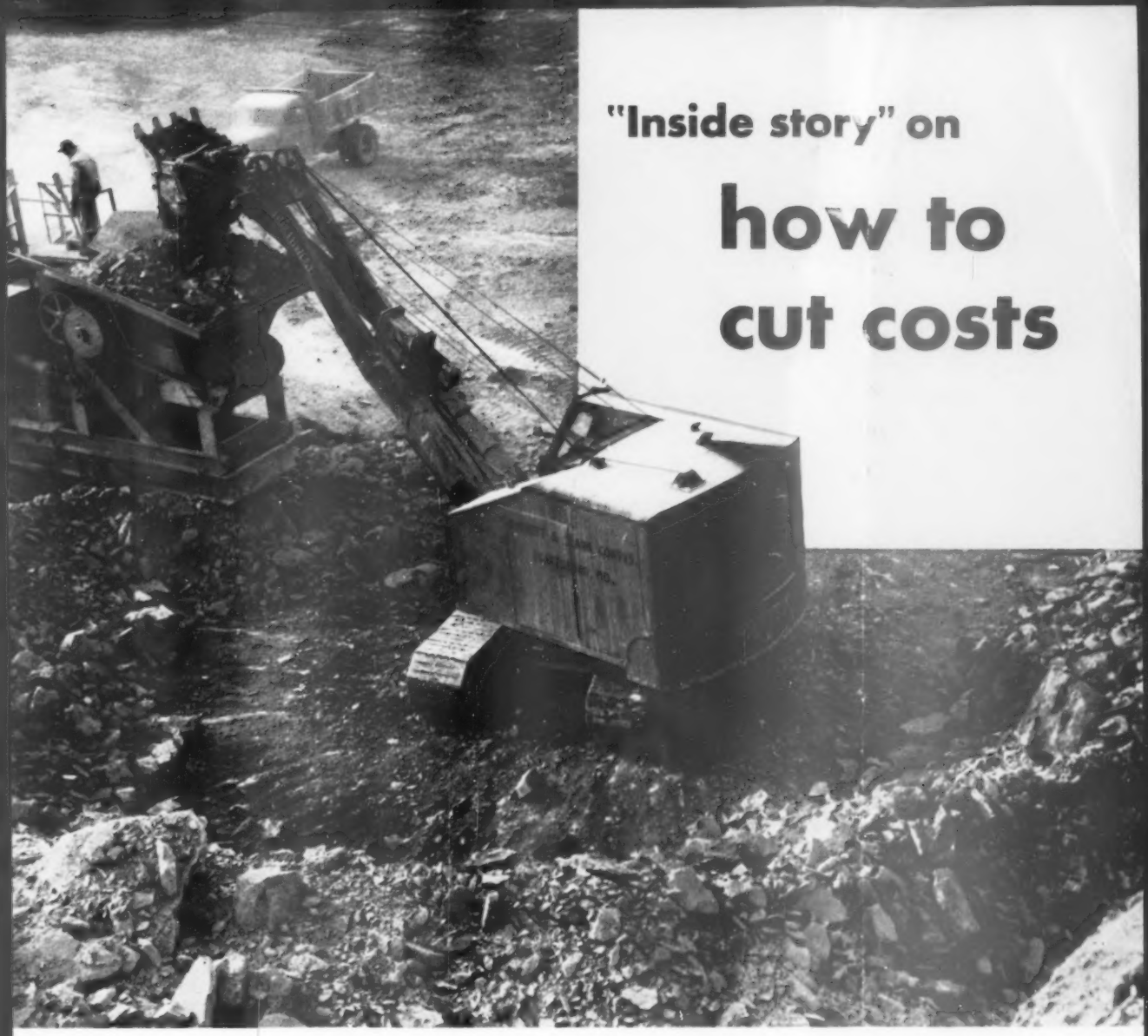
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